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EVERY Young Man's Companion.

CONTAINING

I. Rules and Directions for reading and writing English.

II. A familiar Treatise of Rhetoric, suited to the lowest Capacity.

III. Instructions in the Art of Penmanship.

IV. Of the Care of forming the Manners.

V. Directions for writing Letters, Forms of Address, &c.

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By W. GORDON,
Teacher of the MATHEMATICKS.

The FOURTH EDITION, corrected.
With large Additions, and great Improvements.

LONDON:
Printed for J. RICHARDSON, H. WOODFALL, J. NEWBURY,
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MDCCLXV.

T H E
P R E F A C E.

THE instruction of youth in schools and academies, is certainly the most expeditious method of forming the minds of young persons, and of bringing them acquainted with that kind of learning which their intended station and degree in life will most require. Those therefore that are blest with affluent fortunes, and are under the care of prudent parents or guardians, will stand in no need of the assistance of such treatises as this, unless it be to refresh their memories with what they have formerly been taught, or to look into such subjects as are quite foreign to the instruction of those seminaries of learning.

But there are many promising geniuses, who, through the narrowness of their circumstances, or the neglect of their friends, are forced to endeavour to improve their minds, and regain their lost time as well as they can. To such as these, I hope, the following sheets will be of great use; for

P R E F A C E.

the solidity and variety of the subjects must needs gain the attention of all who have the least inclination to cultivate arts and sciences.

However I have not confined myself to speculative matters, such as the abstracted parts of the mathematics may appear to be at first sight; but have shewn their application to the measuring all sorts of work, to surveying, gauging, and dialling.

Some parts of this work are of universal use, such as the directions for reading and writing, instructions for writing letters, the manner of addressing persons of all ranks, and the various rules of arithmetic. As for the rest, which are designed either for use or recreation, they may be depended upon to be genuine, and such as will not deceive the reader when they are put to the test.

What is said of astronomy is of great use, not only for understanding the system of the universe, but to explain geography and dialling, upon which they in some measure depend. The general account of geography should be well attended to, otherwise it will be impossible to read the accounts of distant countries either with pleasure or profit.

The

P R E F A C E

The directions for painting and colouring relate to such parts only as may be attained without a master, and which any may employ themselves about, either for diversion or otherwise, as their time or necessities permit or require. Upon the whole, no ingenious person will be at a loss for a subject to employ his thoughts or his time about, if he has a relish for solid, useful, and experimental learning.

But perhaps it may be said, that there are books of this kind already which are in every body's hands; and therefore you are only doing the same thing over again.—That there are books published with the same design is acknowledged, but that I have trod in the same steps with their authors I must beg leave to deny; for I have not only treated of the same subjects with more accuracy, but have gone much farther than ever they pretended to. For instance, in dialling they have only shewn how to make two or three dials at the most, and in a very inaccurate manner; whereas I have taught how to project all the useful dials for every part of the world; I have likewise drawn them so true, as well as all the rest of the figures, that they will bear examination with the scale and compasses. But I need not

P R E F A C E

add any more on this subject, for the best way to know the difference will be to compare them together.

The quick sale of the *former impressions*, hath encouraged me to revise the whole treatise, and to make such corrections, alterations, and additions, as are likely to be most conducive to the benefit of the reader; which is the least that could be done by way of acknowledgment for the kind reception this book hath met with from the public.



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EVERY
Young Man's Companion.

RULES and DIRECTIONS for the READING
and WRITING ENGLISH.

OF LETTERS and SYLLABLES.

✱✱✱ **T**O read properly is to express written or printed Words by their usual Sounds: Which Words consist of Letters and Syllables, either one or more; as, *I, the, Table, Improvement.* A Letter is the least Part of a Word, and has a single Sound, as *a, e, m, s.* A Syllable is a distinct Sound made by one Letter alone, as *e, in, a.* Or by more Letters joined together, as *de, dis, the, which.* Letters are twenty-four in Number, *a, b, c, d, e, f, g, h, i, k, l, m, n, o, p, q, r, s, t, u, v, x, y, z.* To these may be added the Consonants, *j* and *w.* Of these, five are Vowels, *a, e, i, o, u;* to which may be added *y.* All the rest are Consonants. A Vowel makes a perfect and distinct Sound of itself: But a Consonant will not make a clear and perfect Sound without joining it to a Vowel. However some make an imperfect Sound, and are called Quies or Half-Vowels; as *l, m, n, t, f.* The rest are Mutes, or quite silent.

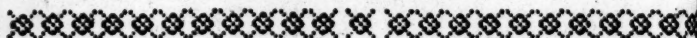
B

I and

I and *u*, as was observed before, become Consonants, and then change their Shape: The *i* is written thus *j*, and the *u* thus *v*. The *j* Consonant sounds like a soft *j*, as *Jacob*; and the *v* Consonant sounds almost like an *f*, as *vary, value, reserve, Nerve*. The Letter *y* is often used as a Vowel, as in *daily, Mystery*. Likewise *ay* is used as a Vowel, when it comes after another Vowel, as *draw, thaw, drown, Town*, and then it is pronounced like a *u*.

A *Diphthong* is the joining two Vowels together to make one Sound in the same Syllable, as *ai* in *Praise* *ee* in *Creed*, *ei* in *seize*, *ie* in *Relief*, *ou* in *Groat*, *oo* in *good*, *ow* in *bow*, *uy* in *buy*. Sometimes two Consonants are joined together; as *fl* in *Flame*, *pl* in *Plow*, *gl* in *glow*, *cl* in *Clow*, *kl* in *Klicker*, *mb* in *Lamb*, *mn* in *condemn*, *mp* in *Hemp*, *mn* in *Stems*, *nd* in *command*, *nk* in *Blank*, *pr* in *Praise*, *str* in *strait*, and many more.

A *Triphthong* is when three Vowels are united to make one Sound; as *Beau, Beauty, quaint, View*. Sometimes three Consonants or more may be joined together; as *fn* and *ngth* in *Strength*, *pbth* in *Phtbifick*.



Of the Alteration of the Sound of LETTERS, and of CONSONANTS that lose their Sound.

SOME Consonants have not always the same Sound, but change it according to the Letter they are placed before, which are principally, *c, g, b, k, f*, and *t*. *C* most commonly sounds like *k*; but before *e, i*, and *y*, it is pronounced like *s*: Like *k* in *Command, Country, Crown*: Like *s* in *Censure, cease, Cycle, Cypher, Cypress*. *G* before *e, i*, and *y*, is pronounced like an *j* Consonant, as *Gem, general, generous, huge, Gesture, Ginger, Clergy*. The following Words are excepted: *Gear, Geese, geld, Gelding, get, gear, ring, Getter, Groggaws, Gibberish, Gobble-gabble, giddy, Gildness, Gift, giggle, Gilt-head, Gimlet, gird, Girdle, Girth, give, Gizzard*. *C* and *g* are always pronounced hard before a Consonant, except when a Vowel has been omitted in Writing, or is cut off by an Apostrophe, as *advant'd* for *advanced*.

G before *b* at the End of a Syllable only serves to make it longer; as *high, bright, light, Sight*; except in the following



Reading and Writing English.

3

Following Words, wherein it is pronounced like *f*; as *Cough*, *Trough*, *Cbough*, *laugh*, *Laughter*, *rough*, *tough*, *Hough*, and *enough*. *G* before *n* almost loses its Sound, some think it should be pronounced like an *b*, as in *gnaw*, *gnash*, *Gnat*, *Gnomon*, *Gnostics*.

H joined with certain Consonants has a peculiar Sound, as *ch* in *Cheek*, *Cherry*, *Chesnut*; *sh* in *shabby*, *Shaker*, *Shame*; *th* in *thaw*, *thank*, *thick*, *thin*; *ph* in *Pheasant*, *Philet*, *Phrase*, where it sounds like an *f*. But we must observe, that there is a Difference in the Sound of *th*, for sometimes it has a hard Sound, as in *this*, *they*; sometimes more soft, as in *bath*, *thin*, *thick*.

K has little or no Sound before an *n*, as in *knock*, *Kate*, *Knight*, *Knot*: Though some think it should be sounded like *b*.

S has sometimes a more hard sound, as in *Kiss*, *Miss*, *Press*, sometimes a more soft, as in *nauseous*, *Noise*, *mus*, *his*, *these*.

Ti, *fi*, and *ci* in the Middle of Words are pronounced like *sh*, as *Vexation*, *precious*, *Precision*; except when an *s* or *x* is placed immediately before the *t* or *f*, as in *Combustion*, *celestial*, *Christian*, *Necessity*: As also before the *ed* or *th* of derivative Words; as *emptied*, *twentieth*, &c. The last are but few. *St* sounds like double *s* in such Words as *these*, *Castle*, *Thistle*, *Whistle*.

B loses its Sound at the End of some Words after *m*, and before *t*, as *Thumb*, *dumb*, *Lamb*, *Comb*, *Debt*, *doubt*, which last are pronounced *det*, *dout*.

C is silent in these Words, *Verdict*, *Visuals*, *Scene*, *Science*, *Muscle*, *Indict*, *Indictment*.

G is not pronounced at the End of a Word, before *n*; as *Sign*, *Reign*, *assign*, *Design*; except *condign*.

H has little or no Sound in these Words *honour*, *honest*, *Heir*, *Herb*, &c.

L in common Conversation is never pronounced in *Psalm*, *Calf*, *Half*, *Fault*, *Talk*, *Holborn*, *Salmon*, *Paulcon*.

N is seldom pronounced after *m*; as in *damn*, *condemn*, *Column*, *Autumn*, *linn*, *solemn*, *Hymn*; nor after *I* in *Malt-Kiln*, *Brick-Kiln*.

P is not sounded in *Receipt*, *empty*, *presumptuous*, *Psalm*, *umpier* *Account*, *Attempt*, *Contempt*, *Psalter*, *sumptuous*, *contemptuous*, *Consumption*, *Symptom*, *tempt*, and *Redemption*.

S loses its Sound in *Isle*, *Island*, *Viscount*, *Demefus*.

W is not pronounced in *Wrath*, *write*, *beuray*, *wrap*, *wrong*, *wreath*, *Wretch*, *wrangle*, *wriggle*, *Where*, *Sword*, *Swoon*, *Answer*.

Of the Pronunciation of VOWELS and DIPHTHONGS; and
of VOWELS that lose their Sound.

EVERY Vowel has a long and a short Sound; besides which, the Letter *a* is pronounced long, short and broad. Thus *a* is pronounced short in *Cat*, *Mat*, *Sprat*, *Hat*, &c. And long in *Mare*, *Cane*, *Share*, *Naprate*, &c. It is sounded broad like *aw*, in *call*, *Pall*, *all*, *Hall*, *Wall*, *fall*, *Malt*, *bald*, *scald*, &c. When it comes before *l* in the same Syllable, or when there is double *l* in the Middle of a Word.

E is pronounced short in *Pen*, *fell*, *Knell*; and long in *these*, *he*, *here*, *even*, *blaspheme*, *Theme*. At the End of some Words it serves only to lengthen the Syllable, as *Cane*, *bate*, *bite*, *Fane*, *Hope*, *Tune*, &c.

I is short in *Fist*, *Mill*, *thick*, and long in *Mile*, *beguile*, *Child*, *thine*. It is pronounced like a short *u* in *first*, *Bird*, *Dirt*, &c. In some Words it sounds like a double *i*; as in *oblige*.

O is short in *not*, *hop*, *Rod*, and long in *Note*, *Hope*, *road*. It sounds like double *o* in *do*, *to prove*, *move*, &c. Like an *i* in *Women*, *Flaggon*. It is pronounced like a *u* in *Mang*, *conjure*, *conspire*, *Attorney*, *Monmouth*, &c.

U is short in *Tun*, *dull*, *cut*, *but*, and long in *Tune*, *Cure*, *demure*, *endure*. But like a short *i* in *bury*, *busy*, *finest*.

No general Rule can be given with Relation to the Length and Shortness of these Vowels; however, there is one Rule, that seldom fails; that is, if a single Vowel comes before a single Consonant in the same Syllable it is short; as *Mat*, *Pen*, *thin*, *hop*, *Cur*. But if, be added after a single Consonant at the End of a Word it is long, as *Mate*, *Scene*; *thine*, *Hope*, *Cure*. However, Custom has made the following Words short; *give*, *live*, *one*, *some*, *come*, *gone*, *done*, *love*, *Deve*.

Sometimes one of the Vowels in a Diphthong loses its Sound; and sometimes a single Vowel does the same; for instance, *a* is not pronounced in *Diamond*; nor *e* before the Liquids *l, m, n, r*; because they have some imperfect Sound of their own, as *Garden, broken, Candle, Castle, Mètre, Lucre, Massacre.*

A single *e* is never pronounced at the End of Words, but when there is no other Vowel in the Word, as *the, be, me, he, we.* The Reason why *e* is placed at the End of a Word has been mentioned before, namely, to lengthen the Syllable; as *Bath, Barbe.* It likewise softens the Sound of *c* and *g*; as *Lac, Lace, Rag, Rage, Spring, Springe.* Besides, it is the Genius of the English Language not to end a Word with any of the Vowels except *y*, unless in a few Particles. Thus for *di* is wrote *Die*; *fo*, *Foe*; *slo*, *Sloe*; *tru*, *True*; *virtu*, *Virtue*, &c.

i is not pronounced in *Juice, Venison, Fruit, Cruize, Marriage, Carriage, Business, Cushion, Fashion, Parliament.*

o is not founded in *People, Proff, Bason, Mutton, Feo-ardy, Bacon, Crimson.*

A single *u* is always pronounced; but when another Vowel follows it, it is often lost; as in *guard, guilty, tongue, Plague, guess, Guess.* But not always; as in *An- uish, Languish, Montagus.* *U* is always written with *q*, and in some Words it is quite silent, as *Musquet, conquer, liquor, Masquerade*; and in all Words borrowed from other languages that end in *que*, as *Burlesque, oblique, risque*, &c.

The Diphthongs in some Words are plainly pronounced; and in others they have a peculiar Sound proper to themselves. Thus *ai* are both pronounced in *Main*; *ou* in *Moufe*; and *ow* in *Coaw.* In some Words one Vowel is only pronounced; as *a* in *Hearts*, *e* in *Bread*, *i* in *Guide*, *o* in *Cough*, and *u* in *rough.* It must be owned, that the superfluous Vowels might be omitted, but Custom has made them necessary, as *broW, agout, end, et, pol, thout, et.*

In some Cases, Diphthongs have a particular Sound, different from the Vowels of which they are composed, as in *Weed, oo* in *soon.*

pronounced one of the vowels in the following manner

XX

Of the Pronunciation of LETTERS in foreign and learned Languages.

IN Words taken from the *Greek* and *Hebrew* *i* is often pronounced like a *k*, as in *Scopia*, *Scepticism*, *Scolium*, *Cis*, *Cenebra*, *Aceldama*.

Ch is pronounced like *k* in Words derived from the *Latin*, *Greek*, and *Hebrew*; as *Christian*, *Chate*, *Chorus*, *Baruch*, *Stomach*, *Anchor*, *Sebeme*, &c. However, *Sebism*, is to be pronounced *Sism*; *Schismatic*, *Sismatic*; *Drachm*, *Dram*. But the *ch* in this last Word is now generally left out in Writing. Again, we pronounce *Rachel*, *Cherubim*, *Archbishop*, and some others, after the *English* Manner. Custom is divided in many Scripture Names, as *Melephizeck*, *Syebicus*, &c.

In *French* Words *ch* is pronounced like *sh*, as *Cherisher*, *Machine*, *Capuchin*, *Chagrin*; which read *Showaler*, *Maheen*, *Capushien*, *Shagrin*.

G is sounded hard in most of the proper Names from foreign Languages, as *Gilber*, *Gibber*, *Gilbert*, *Gulderland*, &c. except *Geoffery*, *George*, *Gyles*, *Egypt*; and all *French* Words, where it is sounded soft.

H in foreign Words is generally sounded as in *English*; but in the following proper Names it is quite lost, *Dorothy*, *Esber*, *Anthony*, *Thomas*, *Arbar*, *Jabu*, *Humphry*; and at the End of Words after a Vowel, as *Skitch*, *Jeremiah*, *Messiah*.

T in *Greek* and *Hebrew* proper Names keeps its own natural Sound, as *Shealtiel*, *Palatiah*, *Phaltiel*, *Shephatiah*, *Castitia*, *Addarnatum*, &c. In *Latin* Words, it is sounded like *sh* in *English*; for Instance, *Gratin*, *Pattius*, &c.

A is almost lost in some foreign Words, as *Bilbin*, *Gulnea*, *Pharab*, *Israel*, and some others.

E is always sounded at the End of *Hebrew* Words, as *Jesse*, *Mamne*; of *Greek*, as *Epitame*, *Candace*, *Phebe*; and of *Latin*, as *Simile*, *Præmunire*; except where the Termination of the Word is made *English*, as *Eve*, *Tyre*, *Cretia*, *Kentite*, *Israelite*, *Ode*, *Scheme*, *Dialogue*, &c. But the Pronunciation of these is only to be learned by observing the

Method

Reading and Writing English.

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Method of those that are most skill'd in the customary Manner of Speaking.

Diphthongs in the learned Languages are few in Comparison of English: There, in Words that are derived from them, the Vowels are generally separated so as to make two distinct Syllables, as *De-us, Po-er, Cri-at, Coe-por-er, Je-su-u, Ide-a, Oe-an, Arch-a-nal, Co-el, Zach-a-ri, Bar-n-a, Ebra-im, Abi-ra-er, Zo-ar, Gib-ber*.

When double *a* or double *e* are met with in Hebrew Names, they are commonly pronounced like a single *a* or *e*, as *Isaac, Canaan, Balaam, Beer-sheba, and Beke-thub*.

We have two Diphthongs brought into English from the Latin Tongue that are often met with, which are *ue* and *eo*, and always sound like the English *i*, as *Ae-nas, E-man, Caesar, Oeconomy, Mecenas, &c.*

Of Spelling, Quantity, and Accent.

Spelling is the Art of composing Words out of Letters and Syllables, either in Reading or Writing. To perform which, all the Letters that make up the first Syllable are to be put together and pronounced; then put the Letters which make up the second Syllable together, and having pronounced them, join them to the first; and proceed in this Manner till the Word is finished; as for Instance in the Word *Remembrance*.

R.	e.	m.	e.
m. e. m.		Re-mem	
b. r. a. n.		Re-mem-bran	
c. e. r.		Re-mem-bran-er.	

To know how many Syllables there are in a Word, you must consider how many distinct Sounds there are in it, or how many Pauses or Stops may be made in the pronouncing of it; for there are just so many Syllables in that Word as in *Par-er*. *Writ-ing* are two Syllables, because there are two distinct Sounds; in *Re-mem-ber* there are three Syllables, because three Sounds.

The

The great Rule for Spelling is to divide the Syllable properly, which is done by putting as many Letters to one Syllable as will make a distinct Sound in pronouncing that Word; as *di-al*, *Con-tempt*, *Mat-ter*, *Sig-ni-fi-ca-ti-on*. When a Consonant comes between two Vowels it must be joined to the latter, as *Pa-per*, *Sha-ker*; except the Letter *x*, which is joined to the Vowel that goes before; as *ex-emplary*, *ex-orbitant*. Observe, that *ph*, *th*, *sh*, are never to be divided, because they are to be reckoned as single Consonants, unless when they are sounded apart, as *up-hold*, *Pot-hook*, *Grass-hopper*.

When two Consonants of the same Kind meet together they must be parted, that is, one to the former Syllable and the other to the latter; as *But-ter*, *Com-mon*, *Mat-ter*, *hor-rid*. Observe also, when several Consonants meet in the Middle of a Word, to place them in the Syllable according to their distinct Sounds, as in the Words *re-fuse*, *be-speak*, *a-skew*, *a-squint*, *fa-ble*. But the self-same Consonants must be divided, one to the first Syllable, and the other to the latter, in the following Words; *Mas-ter*, *Whis-per*, *Bas-ket*, *Mus-quet* *pub-lish*; which is determined by the Pronunciation. Lastly, when two Vowels come together in the Middle of a Word, having two distinct Sounds, they must be divided into two Syllables; as *cru-el*, *cre-ate*, *ru-in*, *No-ab*; though the very same Vowels are Diphthongs in *gues*, *Fear*, *Guilt*, *Goat*.

Compound Words are either made up of two distinct Words; as *where-in*, *thank-ful*, *sap-less*, *Cart-horse*, *up-hold*; or a primitive Word and a Preposition; as *en-able*, *un-equal*, *dis-ease*, *re-strain*, *trans-act*, and the like. Derivative Words are made up of one Word and a Syllable coming after it, which is called a Termination; such as *ed* in *paint-ed*, *en* in *gold-en*, *est* in *Count-ess*, *eth* in *teach-eth*, *er* in *Speak-er*, *ing* in *Read-ing*, *ist* in *Latin-ist*, *ous* in *covetous*, *ly* in *courteous-ly*.

In pronouncing of compound and derivative Words, the Prepositions and Terminations must be spelt distinctly by themselves; except some Words in *Latin*, *Greek*, and *Hebrew*, wherein the primitive Word cannot be distinguished by a mere *English* Scholar; and then he may safely divide them in the common Manner; as *Pro-felyte*, *trans-fient*, *a-dorn*, *In-iquity*, *Be-thel*: which, according to the Original, should be *Prof-elyte*, *trans-ient*, *ad-orn*, *In-iquity*, *Be-thel*.

Reading and Writing English.

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Some of the derivative Words which end in a single Consonant, and double it before the Termination, may be divided according to the common Rule; as *glut*, *glut-ly*; *mad*, *mad-der*; *commit*, *commit-ting*. As also such as end in *e*; and lose it before the Termination, as from *re-quire*, come *requi-teth*, *requi-ter*, *requi-ting*; all which must be spelt by the common Rules.

Besides the dividing of Syllables, every Syllable must have its proper Quantity, and every Word of two or more Syllables its proper Accent.

Quantity, is the Distinction of Syllables into long and short. All long Syllables have a Diphthong in them, as *rain*, *break*; or the Vowel has a long or broad Sound; as *tall*, *bate*, *mope*. All other Syllables are short; as *hat*, *hop*, *bank*.

The Accent is a particular Stress or Force of Sound that the Voice lays upon any Syllable, whether long or short; as in *open*, *Pen* in *Penny*. It is not always the same in the same Words; for when it signifies an Action, it is accented on the last Syllable, as to *contrast*, to *rebel*; but when it signifies a Thing, the Accent is sometimes transferred to the first. The following Table will be a Guide for such as have not yet duly considered this Matter; wherein the first Word is a Noun, the second a Verb.

To **breast**.

An **Accent**.

An **Attribute**.

A **Cement**.

A **Collect**.

A **Compound**.

A **Conduct**.

The **Confines**.

A **Conflict**.

A **Concent**.

A **Contrast**.

A **Converse**.

A **Convert**.

A **Desert**.

A **Ferment**.

Frequent.

Incense.

An **Object**.

To **abstent**.

To **accent**.

To **attribute**.

To **cement**.

To **collect**.

To **compound**.

To **conduct**.

To **confine**.

To **conflict**.

To **concent**.

To **contrast**.

To **converse**.

To **convert**.

To **desert**.

To **ferment**.

To **frequent**.

To **incense**.

To **object**.

An

An Overthrow,	To overthrow.
Prémises,	To premise.
A Présent,	To present.
A Projeét,	To project.
A Rèbel,	To rebel.
A Rècord,	To record.
Rèfuse,	To refuse.
A Subject,	To subject.
A Torment,	To torment.
An U nite,	To unite.

Take Notice, that Nouns derived from Verbs are accented in the same Manner as the Verbs are; as *ferment*, *fermenting*; *collect*, *collector*; *object*, *objection*, *objector*, &c.

Observe likewise, that Compound Words and Derivatives are generally accented like their Primitives; except *prefer*, which has the Accent on the last Syllable, whereas *Préférence* and *préférable* have it on the first. *Finite* has the Accent on the Syllable *Fi*, but *infinite* on the Syllable *in*; and *Infinity* has it restored to the Syllable *fi* again.

When the Accent is laid on a short Vowel before a single Consonant, it makes the Consonant be pronounced double as *Mallice*, *Body*, must be sounded like *Mal-lice*, *Bod-dy*.

Some long Words have two or three Accents; as *universal Transubstantiation*; but generally one of these Accents is much stronger than the other. But there is no certain Rule for placing these Accents, and therefore the Determination is left to Custom. However, it may be observ'd, that in Words of two Syllables, the Accent is generally laid upon the first; as *Morn-ing*, *Gift*. That when the Accent lies on the last Syllable, the Word is almost always a kind of Compound, and the first Syllable is a Preposition; as *com-plete*, *re-solve*, *pre-vent*, *re-turn*. That in Words of three or four Syllables the Accent is seldom laid on the two last Syllables, but on one of the first. And lastly, in Words of six Syllables there are frequently two Accents, one on the first, and the other on the fourth; as *Justi-fication*, *un-philosophical*.

A B
A C
A D
A E
A F
A G
A H
A I
A J
A K
A L
A M
A N
A O
A P
A Q
A R
A S
A T
A U
A V
A W
A X
A Y
A Z
A A
A B
A C

CATALOGUE of some Words that are differently accounted, though the first Column is preferable.

A'cademy,	Acàdemy.
A'ceptable,	Acceptable.
A'dmirable.	Admirable.
Advertisement,	Advertisement.
Attribute,	Attribute.
A'venue,	Avèue,
Cònfessor,	Cònfessor.
Còntemptible,	Còntemptible.
Còntrary,	Contràry,
Còntribute,	Còntribute.
Cònversant,	Convèrsant,
Còròllary,	Coròllary.
Còrrosive,	Còrrosive.
Còrruptible,	Còrruptible.
Còncupiscence,	Còncupiscence.
Dèlectable,	Dèlectable.
Distribute,	Distribute.
Gazette,	Gàzette.
Oecónomy,	Oèconomy.
Rèfractory,	Refràctory.
Sùccessor,	Succèssor.
Tòward,	Towàrd.
U'tensil,	Utènsil.

Of Writing and Spelling true ENGLISH, and the various Ways of Spelling the same Word.

THERE is no Language whatever so irregular in the Spelling as a great Part of the *English* Tongue; therefore it would be a vain Attempt to lay down Rules to write all Words properly: However, there are many may be reduced to some Order. The Rules to be observed in the Performance are as follow.

1. *Cb* at the End of a Word, after a short Vowel, always takes a *t* before it; as *catch*, *fetch*: Except a few common Words, as *much*, *such*, *rich*, *which*.

2. A

2. A Vowel which is to sound long before a single Consonant requires an *e* at the End of a Syllable; as *Fair* Tune: But very seldom after a double Consonant or Diphthong; except after the Letter *c* soft, *g* soft, *z*, *x*, and *w* Consonant; as in *Voice*, *Fence*, *range*, *axe*, *Hedge*, *rouge*, *carve*, *twelve*, &c.

3. When *g* has a soft Sound before a short Vowel, *d* generally must go before it; as *Badge*, *Hedge*, *Ridge*, *Lodge*, *Cudgel*.

4. When *g* is sounded hard after a long Vowel in the End of a Word, *ue* must follow it; as *waguer*, *Plague*, *Catalogue*, *Intrigue*.

5. *Gh* is written instead of *g* in *Ghost*; and *ge* to render the *g* hard, as in *guess*, *Guest*, *guard*, *Guile*, *Guilt*, *Guine*, *Guide*, *Guise*, *beguile*, *disguise*, *guilty*, &c.

6. *K* at the end of a Word after a short Vowel always takes *c* before it; as *Duck*, *crack*, *knock*, *sick*, *Neck*, &c.

7. A double *l* is always used at the End of Words of one Syllable after a single Vowel; as *all*, *call*, *small*, *fall*, *roll*, *full*.

8. Double *s* is generally used at the End of a Word after a Vowel that sounds short; as *pass*, *Goodness*, *Ripeness*, *Fatness*, &c. Except a few common Words of one Syllable; as *as*, *is*, *his*, *this*, *yes*, *was*, *us*, *thus*. Except also when *s* or *es* is added to the Word; as *Horse*, *Horses*, *Asses*, *Kiss*, *Kisses*, *suppose*, *supposes*.

9. A long *f* is never used at the End of a Word, either in Writing or Printing.

10. The Sound *us* at the End of a Word of more than one Syllable, in Words purely English, is written *ous*; as *righteous*, *cautious*, &c.

Though there is but one Way of spelling Words truly yet we may observe some Variations in good Authors which it will be worth while to mention. Thus *in* is changed for *en* in the Beginning of a Word; as *engage*, *engage*; *inquire*, *enquire*; *indanger*, *endanger*; *indure*, *endure*; *intangle*, *entangle*. *Im* is changed into *em*; as *imploy*, *employ*; *imbattle*, *embattle*; *imbezzele*, *embezzle*; *imbark*, *embark*.

K may be left out after *c* in Words borrowed from the Latin and Greek; as *publick*, *public*; *Musick*, *Music*; *Logick*, *Logic*; *Physick*, *Physic*, *Sceptick*, *Sceptic*.

Reading and Writing English.

13

Some turn *oe* Diphthong into a long *o* and *e* final; as
Coal, *Cole*; *Cloak*, *Cloke*; *Smoak*, *Smoke*; *groan*,
one; *Shear*, *Shore*. Or is sometimes written for *our*;
Tumour, *Tumor*; *Colour*, *Color*; *Honour*, *Honor*; *Fa-*
vor, *Favor*; *Conquerour*, *Conqueror*.

Ph is often changed into *f*; as *Phancy*, *Fancy*; *Phanatic*,
fanatic; *prophane*, *prophane*, &c.

Que is changed into *k* or *ck*; as *Barge*, *Bark*; *Traf-*
fic, *Traffic*; *Masque*, *Mask*; *Flasque*, *Flask*; *Relique*,
lick, &c.

Re or *er* is written indifferently in these Words; *Theatre*
heater; *Metre*, *Meter*; *Centre*, *Center*; *Sepulchre*, *Se-*
cher. *S* is sometimes changed into *z*; as *Razor*, *Razor*;
Scissors, *Scizzors*; *Lozenge*, *Lozenge*; *Enterprise*, *Enter-*
ze, &c. Sometimes *c* is improperly wrote instead of *s* in
the following Words; *dispencc*, *Suspence*, *Sence*, *Recompence*,
ience, &c. which should be *dispenſe*, *Suspense*, *Sense*, *Re-*
penſe, *Pretense*, &c.

i and *ci* are written indifferently in these Words; *an-*
ci, *vitious*, *gratious*, *pretious*, *spatious*, &c. *ancient*, *vici-*
ous, *gracious*, *precious*, *spacious*, &c. Though the last Way
is most common.

Some take *ugh* for *though*, and *through* by an Apof-
rophe, thus, *tho'*, *thro'*. And sometimes *ugh* is changed
into *w*; as *plough*, *plow*; *enough*, *enow*; *Bough*, *Bow*;
rough, *thorow*; *Yeugh*, *Yew*. But *enough* is more pro-
perly spoken of Quantity, as, *there is Wine enough*; *enow*
Number, as, *there are enow*.

the Plural of Nouns, the Denomination of Sexes, and the
Preter-Tense and Participle of Verbs.

S it will be impossible to write good *English* without
a Knowledge of the Variation of the Spelling of
Words, caused by the different Numbers, Tenses, Parti-
cles, and Sexes; we shall say as much of these as will be
necessary to prevent Errors in Speaking and Writing.

A Noun is the Name of a Thing that can be perceived
by the Senses or the Understanding. A Noun *Substantive*
is the Name of the Thing itself; as, a *Lamb*, a *Tree*, a
Man. A Noun *Adjective* shews the Manner of a Thing,

or what a Thing is, and must be joined to a Thing who
Manner it sheweth; as, *good, bad, wise, foolish, great, small*.

Noun Substantives have two Numbers, the *Singular* and *Plural*. The Singular Number speaks of one Thing or Person; as, a *Hat, a Boy*; the Plural of more than one, as, *Hats, Boys*. The Plural Number is commonly made by adding *s* to the Singular. Thus *Hand* makes *Hands*, *Girl*, *Girls*. But when the Singular ends in *ch, sh, s, x*, then the Pronunciation requires that *e* be put before *s*, as *Church, Churches; Brush, Brushes; Witness, Witnesses; Box, Boxes*.

Words that end in *f*, or *fe*, make the Plural by changing *f*, and *fe*, into *ves*; as *Calf, Calves; Knife, Knives*, except *Hoof*, which makes *Hoofs*; as also *Roof, Grief, Dwarf, Mischiefe, Handkerchief, Relief, Scarfe, Wharfe, Proof, Strife*; and generally all Words that end in *f*, unless *Staff*, which makes *Staves*. *Y* in the Singular makes *ies* in the Plural; as *Herefy, Heresies; Cherry, Cherries*.

Some Words form the Plural in a particular Manner;

Sing.		Plur.		Sing.		Plur.
<i>Die</i>	} makes	<i>Dice</i>	} makes	<i>Foot</i>	} makes	<i>Feet</i>
<i>Mouse</i>		<i>Mice</i>		<i>Tooth</i>		<i>Teeth</i>
<i>Louse</i>		<i>Lice</i>		<i>Penny</i>		<i>Pence</i>
<i>Goose</i>		<i>Geese</i>		<i>Ox</i>		<i>Oxen</i>
<i>Man</i>		<i>Men</i>		<i>Child</i>		<i>Children</i>
<i>Woman</i>		<i>Women</i>				

Some Words are used in both; as *Sheep, Hofs, Swine, Tern, Deer*.

Some Words have no Singular Number; as *Albes, Belows, Bowels, Breeches, Entrails, Lungs, Scissars, Shells, Snuffers, Thanks, Tongues, Wages*.

Some Words have no Plural Number; as the proper Names of Cities, Countries, Rivers, Mountains: The Names of *Virtues, Vices*; as *Meekness, Drunkenness*: The Names of Metals; as *Gold, Silver, Copper*: The Names of most Herbs; as *Sage, Marjoram, Thyme*; except *Poppies, Lillies, Coleworts, Cabbages, &c.* The Names of several Sorts of Corn and Pulse: as *Wheat, Rye, Darnel*; except *Bean*, which makes *Beans*, and *Pea, Peas*. So *Bread, Wine, Beer, Ale, Butter, Milk, Oil, Honey*, want the Plural; except when you speak of several Sorts of *Wines* or *Oils*.

Gender is the Distinction of the Sex: Now there are two Sexes, *Male* and *Female*, which we have four Ways of distinguishing.

I. W

When we would express the different Sexes, we sometimes do it by different Words.

Male.

Female.

Batchelor	Maid, Virgin
Boar	Sow
Boy	Girl
Bridegroom	Bride
Brother	Sister
Buck	Doe
Bull	Cow
Bullock	Heifer
Cock	Hen
Dog	Bitch
Drake	Duck
Drone	Bees
Father	Mother
Friar	Nun
Gander	Goose
Horse	Mare
Husband	Wife
King	Queen
Lad	Maids
Lord	Lady
Man	Woman
Master	Mistress
Milter	Spawner
Nephew	Niece
Ram	Ewe
Sloven	Slut
Son	Daughter
Stag	Hind
Uncle	Aunt
Widower	Widow
Wizard	Witch
Whoremonger	Whore, Strumpet

When there are not two different Words to express difference of the Sexes, or when both Sexes are comprehended under one Word, then we add an Adjective to signify the Sex; as a *Male Child*, a *Female Child*; or a *Goat* for the Male, and a *She Goat* for the Female.

Sometimes another Substantive is added to the Word to signify the Sex; as a *Man-Servant*, a *Maid-Servant*, a *Sparrow*.

IV. There are likewise some few Words which distinguish the Female Sex from the Male by the ending in *ss*.

Male.

Females.

Abbot	Abbess
Actor	Actress
Adulterer	Adulteress
Ambassador	Ambassadress
Count	Countess
Deacon	Deaconess
Duke	Dutchess
Electer	Electress
Emperor	Empress
Governor	Governess
Heir	Heiress
Jew	Jewess
Lion	Lioness
Marquis	Marchioness
Master	Mistress
Patron	Patroness
Prince	Princess
Prior	Prioress
Poet	Poetess
Prophet	Prophetess
Shepherd	Shepherdess
Tutor	Tutress
Viscount	Viscountess

The common Words to express the Sex by is *he*, or, but when we speak of a Thing that is neither Male Female, we use the Word *it*; we also use *it* when the is undetermined; as, *do not wake the Child, it is asleep.* it is customary to call Things Male and Female that not so. Thus we call the Sun *he*, and the Church *she*.

These are *Irregularities in the Formation of Verbs*, which have occasioned many Mistakes both by Speaking & Writing, which I shall now take Notice of, that Error that Kind may be avoided.

The first Irregularity takes its Rise from the Quickness of Pronunciation, by changing *d* into *t*, that it might speak more free and easy. For *c*, *ch*, *ph*, *f*, *k*, *p*, *x*, also *s*, *th*, pronounced hard, and sometimes *l*, *m*, *n*, when a short Vowel goes before, more easily take *t* than *d*; as *plac't* for *plac'd* or *placed*; *snatcht* for *snatch'd*.

catch'd or *snatched*; *fish* for *fish'd* or *fished*; *stuff* for *stuff'd* or *stuffed*; *clap* for *clap'd* or *clapped*; *mix* for *mix'd* or *mixed*; *wak* for *wak'd* or *waked*; *dwelt* for *dwel'd* or *dwelled*; *smelt* for *smel'd* or *smelled*.

But *d* is retained after *b, g, v, w, z*; as also *s, t*, when *ly* pronounced, *d* likewise remains after *l, m, n, r*, when Vowel goes before. Thus *liv'd, smil'd, raz'd, believ'd, m live, smile, raze, believe*: Except *felt* from *feel*; *meant* from *mean*; *left* from *leave*; *be-* from *bereave*, &c.

Another common Irregularity relates only to the passive participle, which formerly often ended in *en*; as *been, gi-* *ven, taken, slain, known*; of the Verbs *to be, to give, to* *take, to slay, to know*. We also use *written, bitten, eaten,* *shotten, rotten, chosen, broken*; as *writ, bit, eat,* *shot, rot, chose, broke*. Thus likewise we say, *shewn* *shew'd*; *mown, or mow'd*; *loaden, or loaded*; *laden, or* *led*.

But these Irregularities will appear more plainly from the following Tables.

T A B L E I.

Present Tense.	Preter Tense and Participle.	Present Tense.	Preter Tense and Participle.
wake	awoke.	feed	fed.
abide	abode.	feel	felt.
be	been.	fight	fought.
bind	bent.	find	found.
bend	unbent.	flee	fled.
bereave	bereft.	fling	flung.
beseech	besought.	fraight	fraught.
bound	bound.	geld	gelt and gelded.
bleed	bled.	gild	gilt.
breed	bred.	gird	girt and girded.
bring	brought	grind	ground.
buy	bought.	hang	hung.
catch	caught.	have	had.
creep	crept.	hear	heard.
deal	dealt.	keep	kept.
dig	dug and digged	lay	laid.
dream	dreamt.	lead	led.
dwell	dwelt.	leave	left.

Rules and Directions for the

Present Tense	Preter Tense and Participles.	Present Tense	Preter Tense and Participles
leap	leapt.	spell	spelt.
lend	lent.	spill	spilt.
lose	lost.	spend	spent.
loose	loosened and loos'd	spin	spun.
make	made.	stand	stood.
mean	meant.	stick	stuck.
meet	met.	sting	stung.
rend	rent.	sweep	swept.
say	said.	teach	taught.
seek	sought.	tell	told.
sell	sold.	think	thought.
send	sent.	weep	wept.
shine	shone and shined.	wind	wound.
sit	sat.	work	wrought and work
sleep	slept.		
smell	smelt.	wring	wrung.

~~~~~

Of the right placing or joining Words together in a Sentence

**T**HE Substantive that *is, does or suffers*, comes before the Verb; as *I am: William loves: The Book is read.* But when a Question is asked, Verb is put before the Substantive; as, *Is John at Home?* When there is an auxiliary or helping Verb, then the Substantive comes after that; as, *Does Mary love? Will she walk?* When there are two helping Verbs, the Substantive is placed after the first, *Might Charles have brought the horse?* Likewise in case of a Command, the Substantive is after the Verb; as *walk thou, walk ye.* As also when the Verb is used by Way of Yielding or Concession; as *I know, he should not have done it.* Again, when the Verb is put before the Verb, the Nominative Word is put after the Verb; as, *there came a Man to me.* Moreover we say *It was John that spoke last. It was the Glass that broke. Then followed the Armourers Company. Say I, for I said so, for he said.*

When the Genitive Case and another Substantive come together, the Genitive Case is always put first; as *John's Horse, not Horse John's.*

An Adjective is placed immediately before the Substantive; as *a good Boy, a good Girl, good Books, good Cases.*

unless a Verb comes between the Adjective and the Substantive, as *happy is the Man*: Or when some other Word dependeth on the Adjective; as, *a Subject loyal to his prince*.

But when there are more *Adjectives* than one joined together, or one Adjective with other Words depending on the Adjective is generally set after the Substantive; as *Scholar both diligent and learned, a Physician very skilful*. We likewise say, *a diligent and learned Scholar, a skilful Physician*.

When two Substantives are put together in Composition, the first assumes the Nature of an Adjective, and is commonly joined to the following Substantive by a *Hyphen* (-); as *a Sea-Crab, a Land-Crab*; that is a Crab of the Sea, a Crab of the Land: *A Wine Vessel, a Vessel for Wine; Home-made, made at home*.

The Article *A* is joined only to a Substantive of the Singular Number, and may be applied indifferently to any person or Thing. It signifies *one*, but not in a strict Sense, unless in this Phrase, *All to a Man*. But when a Substantive begins with a Vowel or an *h*, then we write *an* instead of *a*, if the *n* be sounded; as, *an Eye, an Hour*: But *a Mare, a Hound, a Hand, a Habit*.

*The* is joined to Substantives as well Plural as Singular, and shews what particular Thing is meant in speaking or writing. It signifies the same as *that*, but not so fully.

The *Pronoun* either is placed before a Verb, or comes after it in a different State; as, *I love the Master, the Master loves me, not I*. But *whom* is generally placed before the Verb; as, *He is the Man, whom I saw*. But after the Verb *am* or *be*, we say it is *I*, not *me*.

The Word that answers to the Question, *who is? who does? or, who suffers? of what is? what does? or what suffers?* is the Substantive to which the Verb relates, and is called the *Nominative Word*; as, *I love; Who loves? We read; Who read? We. The Book is read. What is read? The Book*. Here *I, We, and Book*, are the *Nominative Words*, which are called in *Latin*, the *Nominative Cases*.

Not only Nouns and Pronouns Substantive are *Nominative Words* to the Verb; but whatever denotes that which *is*, or *does*, or *is done*, is accounted a *Nominative Case* to the Verb: As, *To play will please; What will please? To play:*

**play** : Therefore *to play* is a Nominative to the Verb *play*.  
Any Sentence may likewise be a Nominative to the Verb,  
as, *It is clear the Sun shines* : What is clear ? *That the Sun  
shines*. Therefore, *That the Sun shines*, is the Nominative  
to the Verb *clear*.

When a Verb is put Infinitively, that is, with the Preposition *to* before it, or if a Sentence be the Nominative to a Verb, we usually set the *Verb infinitive*, or the *Sentence*, after the other Verb, and put *It* before it; as, *It is an evil Thing to lye*; that is, *A Lye is an evil Thing*, *It is the Custom of Boys to neglect their Books*; that is, *To neglect their Books is the Custom of Boys*.

The Verb must be of the same Number and Person as the Nominative Word or Substantive to which it relates as *Paul readeth*, *Boys read*. Whereas if you were to say *Paul read*, or *Boys readeth*, it would be false Grammar.

But when two Substantives Singular are joined together they speak of more than one; as *William and Mary love* not *loves*, or *loveth*. Likewise when a Noun of the Singular Number comprehends more Things than one, the Verb may be put either in the Plural or Singular; as *Parliament has or have examined the Witnesses*. Where *has* is the Singular Number, and *have* the Plural.

The Adverb *not*, of denying, is put after the Verb;  
*It burned not*, or *it did not burn*.

*A single Sentence* has but one *finite Verb* in it; as *Life is short*. By a *finite Verb* is meant any Verb that is not put infinitively, that is, with *to* before it; as, *to love, to read*. A *compound Sentence* is when two single Sentences are joined together by some *Couple* or *Tie*; as *Life is short, and Art is long*; or, *Life is short, but Art is long*.

Not only *Conjunctions*, but *relative* and *comparative Words* join single Sentences together; as, *This is the Man who I saw. He is the Man that stole the Horse. This is the Boy who came to our House. I heard such a Story as you never heard in your Life.*



**Of Points, Notes, and Great Letters used in Printing and Writing.**

**T**HE *Points or Marks* used in Writing and Printing may be distinguished into three Sorts; *Stops of Voice, Notes of Affection, and Marks in Reading.*



The *Stops of the Voice* shew where to make a Pause and take Breath; and these are four: *Comma* (,) *Semicolon* (;) *Colon* (:) and *Period* or full Stop (.)

A *Comma* is the shortest Pause or Rest in Speech, and is chiefly used in distinguishing Nouns, Verbs, and Adverbs;

*Neither Death, nor Life, nor Angels, nor Principalities, nor Powers, shall separate me from the Love of God. A good man, and a learned. To exhort, to pray. Sooner, or later, every Body must die.*

A *Semicolon* is the Mark of a Pause that is greater than Comma, and less than a Colon. The proper Place for this Point is the Subdivision of the Members or Parts of a

sentence: *As the Shadow moves, and we do not perceive it; as the Tree grows, and we do not apprehend it; so Man, &c.* and especially where there is a Sort of Opposition between one and the other; as, *And such were some of you; but are washed, &c.*

A *Colon* is used when the Sense is perfect, but the Sentence not ended; as, *If you sing, you sing ill: If you read, you sing.*

A *Period* or full Stop is the greatest Pause, and is set after the Sentence is compleat and fully ended; as *God is the truest Good.*

The *Notes of Affection* are these two, *Interrogation* (?) and *Exclamation* (!). A Note of Interrogation is a Kind of Period, for the Distinction of such Sentences as are proposed by Way of Question; as, *Does he yet doubt of it?*

A Note of Exclamation or Admiration is a Note of Distinction for raising the Tone or Voice, upon Occasion of such Words as denote some sudden Passion of the Mind, as *admiring, wishing, or crying out; as, O the Folly of Man! Alas! Alas! How is the City fallen!*

The other Marks used in Reading are these twelve. 1. *Apostrophe* ('). 2. *Hyphen* (-). 3. *Parenthesis* ( ). 4. *Brackets* [ ]. 5. *Paragraph* ¶. 6. *Quotation* (" "). 7. *Section* §. 8. *Ellipsis* —. 9. *Index* ⚭. 10. *Asterisk* \*. 11. *Obelisk* †. 12. *Caret* (^).

An *Apostrophe* is set over a Word where some Letter is left out; as *lov'd, fear'd, for loved, feared.*

A *Hyphen* joins two Words, as *Coach-man, Lilly-root,* or if a Line ends in the Middle of a Word, it is used to shew that those divided Syllables are to be joined together in Reading.



A *Parenthesis*, serves to distinguish an additional Part of the Sentence, that is, not necessary to compleat the Sense, but is brought in by the bye to explain and illustrate it; as *Your Kindness to me (which I look upon as a great Happiness) makes me undergo, &c.*

*Brackets* or *Crotchets*, are used to include a Word or two which is mentioned in the Sentence, as the very Matter of Discourse; as, *The little Word [Man] makes a great Noise in the World.* These Brackets are also used sometimes to include a Part of a Sentence that is quoted from another Author; as *some suppose when David said [Thou wilt shew me the Path of Life] he foretold the Resurrection of Christ.*

The *Paragraph* is now seldom used unless in the Bible, and is intended to distinguish where another Sense or Subject begins.

A *Quotation* is marked with reversed Commas, which are used when something is repeated or quoted out of another Author; sometimes only at the Beginning and End of the Passage quoted, and sometimes at the Beginning of every Line of it.

A *Section* is used for the same Purpose in other Books, as a *Paragraph* in the Bible; and is for dividing Chapters of any Book into several Parts. However, this Mark is now seldom or never used in the *English* Language; but *Section* or *Section* is put in its Room.

*Ellipsis*, or, as some call it, a *black Line*, is used when Part of the Word is left out; as *P. . . . t.* for *Parliament*: Or when Part of a Sentence or Verse is wanting or omitted; as,

Remember Milo's End.  
Wedg'd in the Timber which he strove to reach.

When Part of a Book or Chapter is lost, it is sometimes marked thus;

An *Index* or *Hand*, points to something very remarkable, which ought to be taken Notice of.

An *Asterism*, *Asterisk*, or *Star*; also an *Obelisk* or *Dagger*, and other Marks, as *†*, *‡*, *§*, &c. refer the Reader to something in the Margin, or at the Bottom of the Page.

A *Caret* is placed under the Line where some Word or Syllable is left out; which is written above the Line, and should be read where this Note stands; as

never

Still shall I bear, and quit the Score?

▲

Besides

Besides all these, there are crooked Lines usually called  
 Races, which are used to couple two or more Words or  
 Lines together, as

The Letter *A* has a  $\left. \begin{array}{c} \text{long} \\ \text{short} \\ \text{or} \\ \text{broad} \end{array} \right\}$  Sound.

It is likewise sometimes used in Poetry, when three Lines  
 have the same Rhyme or Ending.

*I chanc'd an old Corycian Swain to know,  
 Lord of few Acres, and those barren too;  
 Unfit for Sheep or Vines, and more unfit to sow,  
 Yet lab'ring well his little Spot of Ground,  
 Some scatt'ring Pot-herbs here and there were found.*

A *Diæresis*, or two Points (..) placed over a Vowel  
 when two come together, shew they make distinct Sylla-  
 bles; as, *Raphäel*. An Accent (') shews where the Stress  
 the Sound is to be placed; as, *constant*. A Circum-  
 flex (A) is placed over a Syllable that is to be pronounced  
 long; as, *Euphrâtes*. A double Accent shews the following  
 Consonant is to be pronounced double; as, *bû-niss*.

*Emphasis* is used for the Distinction of such Word or  
 Words wherein the Force of the Sense doth more peculi-  
 ly consist; and is usually expressed by putting such  
 Word in another Character; as,

*Now Night had shed her silver Drops around,  
 And with her sable Wings embrac'd the Ground.*

Some write the *emphatical Word* with a capital Letter,  
 when the rest of the Nouns are wrote with a small Letter,  
 except such as Custom requires to be so wrote. What  
 these are it will be now proper to explain.

A Capital or great Letter must never be used among  
 the small in the Middle of a Word or Words, but only at  
 the Beginning of a Word. 1. At the Beginning of any  
 Writing, Book, Chapter, or Paragraph. 2. After a full  
 stop when a new Sentence begins, and after a Colon.

At the Beginning of every Line in Poetry, and every  
 Verse in the Bible. 4. At the Beginning of proper Names  
 of all Kinds; Of Men and Women, as *Thomas, Mary*; of  
 Places, as *Canterbury*; of Ships, as the *Speedwell*; of Ri-  
 vers, as the *Severn*; of Dignities, as *King, Queen, &c.*  
 All the Names of God; as *God, Lord, the Eternal, the*  
*Almighty.*

*Almighty.* 6. Remarkable Words may be all wrote great Letter; as, I AM THAT I AM. 7. When I O are single Words, they must always be wrote in Capitals, *I walk, O brave!* 8. Great Letters are used to express Numbers.

|                                            |               |                               |
|--------------------------------------------|---------------|-------------------------------|
| 1                                          | One           | I                             |
| 2                                          | Two           | II                            |
| 3                                          | Three         | III                           |
| 4                                          | Four          | IV                            |
| 5                                          | Five          | V                             |
| 6                                          | Six           | VI                            |
| 7                                          | Seven         | VII                           |
| 8                                          | Eight         | VIII                          |
| 9                                          | Nine          | IX                            |
| 10                                         | Ten           | X                             |
| 11                                         | Eleven        | XI                            |
| 12                                         | Twelve        | XII                           |
| 13                                         | Thirteen      | XIII                          |
| 14                                         | Fourteen      | XIV                           |
| 15                                         | Fifteen       | XV                            |
| 16                                         | Sixteen       | XVI                           |
| 17                                         | Seventeen     | XVII                          |
| 18                                         | Eighteen      | XVIII                         |
| 19                                         | Nineteen      | XIX                           |
| 20                                         | Twenty        | XX                            |
| 30                                         | Thirty        | XXX                           |
| 40                                         | Forty         | XL                            |
| 50                                         | Fifty         | L                             |
| 60                                         | Sixty         | LX                            |
| 70                                         | Seventy       | LXX                           |
| 80                                         | Eighty        | LXXX                          |
| 90                                         | Ninety        | XC                            |
| 100                                        | One Hundred   | C                             |
| 200                                        | Two Hundred   | CC                            |
| 300                                        | Three Hundred | CCC                           |
| 400                                        | Four Hundred  | CCCC                          |
| 500                                        | Five Hundred  | D or I <sup>o</sup>           |
| 600                                        | Six Hundred   | DC or I <sup>o</sup> CC       |
| 700                                        | Seven Hundred | DCC or I <sup>o</sup> CCC     |
| 800                                        | Eight Hundred | DCCC or I <sup>o</sup> CCCC   |
| 900                                        | Nine Hundred  | DCCCC or I <sup>o</sup> CCCCC |
| 1000                                       | One Thousand  | M or CI <sup>o</sup>          |
| 1764                                       |               | MDCCLXIV                      |
| One thousand seven hundred and sixty-four. |               |                               |

Table of ABBREVIATIONS or CONTRACTIONS, wherein one, two, or three Letters stand for one, or more Words.

SOME of these Abbreviations are so common that they are understood by almost every one; and except such as are not to be imitated either in Writing or Printing; every Thing that tends to puzzle the Reader should be avoided as much as possible. What Person of common sense would write *A.* or *An.* for *Answer*? And yet such contractions as these serve to enlarge the Catalogues in common Books, I shall therefore take Notice of the most usual, and such as have been put in the Title Page of books or otherwise.

|                                                        |                                                                                      |
|--------------------------------------------------------|--------------------------------------------------------------------------------------|
| <i>B.</i> or <i>B. A.</i> Batchelor of Arts.           | <i>Ibid. ibidem</i> , in the same Place                                              |
| <i>Archbishop.</i>                                     | <i>I. S. H.</i> <i>Iesus Hominum Salvator</i> , or. <i>Iesus</i> the Saviour of Men. |
| <i>D. Anno Domini</i> , or in the Year of our Lord.    | <i>I. N. R. I.</i> <i>Iesus</i> of Nazareth King of the Jews.                        |
| <i>M.</i> or <i>M. A.</i> Master of Arts.              | <i>J. D.</i> <i>Juris Doctor</i> , Doctor of Law.                                    |
| Book.                                                  | <i>K.</i> King.                                                                      |
| <i>A.</i> Batchelor of Arts.                           | <i>Km.</i> Kingdom.                                                                  |
| Bishop.                                                | <i>Kt.</i> Knight                                                                    |
| <i>V. M.</i> Blessed Virgin Mary.                      | <i>Ld.</i> Lord.                                                                     |
| <i>C. C.</i> Corpus Christi College.                   | <i>L. C. J.</i> Lord Chief Justice.                                                  |
| <i>C.</i> <i>Centum</i> , a Hundred.                   | <i>Ldp.</i> Lordship.                                                                |
| <i>S. Custos Sigilli</i> , Keeper of the Seal.         | <i>Ladp.</i> Ladyship.                                                               |
| Duke.                                                  | <i>LL. D.</i> <i>Legum Doctor</i> , Doctor of Laws,                                  |
| Doctor.                                                | <i>M.</i> Marquis                                                                    |
| <i>D.</i> Doctor in Divinity.                          | <i>M. A.</i> Master of Arts.                                                         |
| Ditto, or the same.                                    | <i>Math.</i> Mathematician.                                                          |
| Earl.                                                  | <i>M. D.</i> <i>Medicinæ Doctor</i> , or Doctor in Physic.                           |
| or <i>ex. gr.</i> <i>Exempli gratia</i> , for Example. | <i>Mr.</i> Master.                                                                   |
| <i>S.</i> Fellow of the Royal Society.                 | <i>Mrs.</i> Mistress.                                                                |
| Honourable.                                            | <i>MS.</i> Manuscript.                                                               |
| <i>Idem</i> , the same                                 | <i>MSS.</i> Manuscripts.                                                             |

|                                                               |                                               |
|---------------------------------------------------------------|-----------------------------------------------|
| <i>M. S.</i> <i>Memoriae sacrum</i> , sacred to the Memory.   | <i>Rt. Honble.</i> Right Honorable.           |
| <i>N. B.</i> <i>Nota bene</i> , Mark well.                    | <i>St.</i> Saint.                             |
| <i>N. S.</i> New Style.                                       | <i>S. S. T.</i> <i>Sacrosancta Theologia</i>  |
| <i>O. S.</i> Old Style.                                       | Holy Divinity.                                |
| <i>Penult.</i> Last save one.                                 | <i>S. T. P.</i> Doctor in Divinity.           |
| <i>Per Cent.</i> By the Hundred.                              | <i>S. Sc.</i> Sacred Scripture.               |
| <i>P. G.</i> Professor in Gresham College.                    | <i>S. Scilicet</i> , to wit, or that          |
| <i>P. S.</i> Postscript.                                      | <i>Sh.</i> Shire.                             |
| <i>q. d. quasi dicat</i> or <i>dicas</i> , As much as to say. | <i>Sr.</i> Sir.                               |
| <i>Q.</i> Queen or Question.                                  | <i>Ult. Ultimam</i> , last.                   |
| <i>R. Rex</i> , King, or <i>Regina</i> Queen.                 | <i>V. Kide</i> , see.                         |
| <i>G. R.</i> King George.                                     | <i>Viz. Videlicet</i> , or that is.           |
| <i>C. R.</i> Queen Carolina.                                  | <i>V. g. Verbi gratia</i> , for               |
| <i>Rev.</i> Reverend.                                         | Word's Sake.                                  |
| <i>Rt.</i> Right.                                             | <i>Wp.</i> Worship.                           |
| <i>Rt. Worpsful</i> Right Worshipful.                         | <i>Wpsful.</i> Worshipful.                    |
|                                                               | <i>Et c.</i> <i>Et cetera</i> , and so forth. |
|                                                               | <i>Et.</i> <i>Et.</i> and.                    |

A FAMILIAR  
TREATISE OF RHETORIC

Adapted to the lowest CAPACITY.

**R**HETORIC is the Adornment of Language, and therefore properly be term'd, *the Art of speaking writing with Elegance and Dignity*. For its principal is to *instruct, persuade, and please*. Elegance consists in the *Purity and Clearness* of the Language. *Purity* requires choice and proper Words, to be acquired from the Authors; the politest Company, and from frequent careful Composition. *Clearness* is to be obtained by Meditation upon your Subject, till a full Knowledge succeeds. Doubtful Words, a stiff Conciseness, long periods, and a Confusion of *Metaphors*, are to be avoided. Dignity arises from sublime Thoughts, noble Tropes,



oving Figures. Tropes alter and affect single Words. at Figures affect and enliven whole Sentences.

A Trope is the elegant Conversion of a Word from its natural and proper to a relative Signification. Thus when it is said that God is my Rock, the last of these Words being known to signify a firm and immovable Place of Security, it immediately excites in us a Notion of that unerring Protection which they secure to themselves who religiously depend upon the Goodness of God.

Tropes are used for the Sake of an agreeable Variety. They divert the Mind, and revive the Attention. In many Cases there is an absolute Necessity for repeating the same Thing several Times. To prevent all Offence which this might give, the Expression is carefully diversified, and plain and figurative Language are judiciously blended. Thus Tropes encrease the Stores of Expression, adding Ornament and Emphasis to Discourse, and as it were delineating Ideas with the Paint or Imagery of Nature; by which they are conveyed to the Understanding of others with improved Strength and a more striking Lustre. Thus Virgil, calling the two Scipios, 'the Thunderbolts of War,' represents the rapid Speed and victorious Progress of their Arms with more Emphasis than all the plain Terms of the Roman Language could have done. When to describe the Pleasantness of a rich Harvest, it is said, 'the Fields sing and sing,' there is raised in the Mind a gay and more delightful Conception both of the Fruitfulness of the Crop, and the Cheerfulness of the Season, than a long particular Relation in the best-chosen plain Words could have raised. Thus they shew to Advantage the Fertility of an Author's Fancy, stepping out of the common track, to fetch in something noble, new, and entertain-

Let these should never be used, but when they are at least as plain as, or more expressive than, proper Terms. They are the Riches of a Language, and are not to be used indiscreetly. Too many of them only encumber and obscure the Discourse, which they are intended to re-  
fresh and enlighten.

It behoves us also to be careful that there be an easy unforced Relation between the Trope and the Thing intended to be expressed and illustrated by it. Where

this Suitableness and Relation is wanting, the Expression will at best be harsh and unpleasant, often barbarous and ridiculous. This Connexion ought to be so close and evident, that the one cannot well be mentioned without raising the Idea of the other. Nor should a *Trope* be redundant, expressing more or less than the Thing requires. It also demands our Care, that Things capable of heightening and Ornament be not debased by low Expressions; nor small Matters over-magnified by pompous and swelling Words.

A *Trope* should be obvious and intelligible. Should you call an House of Debauchery 'a dangerous Rock of Youth,' the Relation is plain to every Capacity; but should you call it 'the *Syrtes* of Youth,' 'tis far-fetched and obscure; because few know the *Syrtes* to be Sands on the Coast of *Afric*, which inevitably swallow up all the Ships that fall into them. It should also be chaste and inoffensive: For vile and debauched Expressions are the first Marks of an abject and grovelling Mind.

Debauchery to Wit has no Pretence;  
For Want of Decency is Want of Sense.



## CHAP. II.

1. **A** METAPHOR is a closer Comparison interwoven in the Sentence, and differs from a Simile or Comparison properly so called, in that it wants the usual Form of Introduction. Thus we say, that 'God is a Shield' and 'a Flood of Tears:' But the same Language in proper Comparison would be, 'God is as, or, as it were, a Shield,' and 'her Tears were as a Flood.' This is very strong and beautiful in that noble Passage of *Lucan*.

*For who did ever in French Authors see*

*The comprehensive English Energy?*

*The weighty Bullion of one sterling Line,*

*Drawn in French Wire, would thro' whole Pages*

his lively Way of Expression is of extraordinary Use in  
criptions of considerable Length, keeping the Mind  
ed, and the Attention vigilant. Metaphors are very  
tiful, when the Properties of rational Creatures are  
ed to Animals, and those of Animals to Plants and  
s. And we receive the strongest Pleasure from those  
and comprehensive ones, which, besides the Illustra-  
of the Subject they are intended to raise and improve,  
ey to us a fresh and sprightly Image; as in *Milton*:

——Sweet the coming on  
Of grateful Evening mild, then silent Night  
With this her solemn Bird, and this fair Moon,  
And these the GEMS of Heav'n, her starry TRAIN.

in *Prior*:

her Hair  
ty'd, and ignorant of artful Aid,  
down her Shoulders loosely lay display'd;  
d in the jetty Curls *ten Thousand Cupids play'd*.

the same Author, you see this Figure delightfully  
ed on in the following Instance:

Love, spontaneous TREE, its parted Root  
st from two Hearts with equal Vigour shoot:  
hilst each, delighted and delighting, gives  
e pleasing Ecstasy which each receives:  
erish'd with Hope, and fed with Joy, it grows;  
he cheerful Buds their opening Bloom disclose;  
d round the happy Soil diffusive Odour flows.  
angry Fate that mutual Care denies,  
e fading Plant bewails its due Supplies;  
d with Despair, or sick with Grief, it dies.

ALLEGORY is an *Assemblage or Combination of dissi-*  
METAPHORS, which have all a near Relation to the  
subject. The Use of it is to convey our Meaning  
disguised Terms, when to speak it out in plain,  
ot be so safe, so seasonable, or effectual to the In-  
on or Entertainment of the Hearer. We shall  
lify this by the following Lines from Sir John Den-  
Cooper's *Hill*:

But his proud Head the airy Mountain hides  
 Among the Clouds; his Shoulders and his Sides  
 A shady Mantlet cloaths; his curled Brows  
 Frown on the gentle Stream, which calmly flows,  
 While Winds and Storms his lofty Forehead beat;  
 The common Fate of all that's high or great.

And from *Prior's Henry and Emma*:

Did I but purpose to embark with thee,  
 On the smooth Surface of a Summer's Sea,  
 While gentle Zephyrs play with prosp'rous Gales,  
 And Fortune's Favour fills the swelling Sails;  
 But would forsake the Ship, and make the Shore,  
 When the Winds whistle, and the Tempests roar?

For the Preservation of Propriety and Decorum, an *Allegory* should end as it began, and the same Metaphor which was chosen at first, be continued to the last. Under this Class come *Apologues* or Fables, *Parables*, and *Enigmas*, or Riddles.

3. METONYMY substitutes one Name for another, where there is a near Relation between both. So the Seas are called the Deeps in Mr. Pitt's *Virgil*:

So did the roaring Deeps their Rage compose,  
 When the great Father of the Floods arose.

And Poetry the Muse by Mr. Pope:

Life's idle Business at one Gasps be o'er,  
 The Muse forgot, and thou be lov'd no more!

Thus for Gods and Men Mr. Dryden says Heav'n and Earth, and Hand instead of Note:

The Master saw the Madness rise,  
 His glowing Cheeks, his ardent Eyes;  
 And while he Heav'n and Earth defy'd,  
 Chang'd his Hand, and check'd his Pride.

As for Light Mr. Thompson uses Day:

And sheds the shining Day, that burnish'd plays  
 On Rocks, and Hills, and Tow'rs, and wand'ring Stream  
 High-gleaming from afar.

By this *Trope* any of the most significant Circumstances or Appendages of a Thing are put for the Thing itself. It is made Use of to great Advantage, 1st, When the Narration or Counsel stands for the Action, and what the Writer describes he is said to do: And 2dly, When the Name of any Relation is put for the Duty which that Relation requires; and the Benevolence proceeding from it. Thus *Anacreon*, speaking of Money, says that, through it, Brethren and Parents are no longer in the World; the most sacred and endearing Relations of Nature are lost, through an immoderate Love of Riches:

May the Wretch be doubly curs'd,  
Who was charm'd with Riches first;  
Through the captivating Store  
*Brothers, Parents* are no more.

And 3dly, When Rivers, which are remarkable, are mentioned by the Poets to express the Country, in which they rise, or through which they flow, as

—— *Euphrates* moves the War.

ANTONOMASIA is a Branch of the *Metonymy*. It signifies the Exchange of Names; and is either the Exchange of common Names for proper, or of proper Names for common:

In Cruelty he was a *Nero*,  
In Wealth a *Craesus*, but no Heroe.  
The \* Roman bled at every Vein,  
The † Carthaginian conquer'd then.

4. SYNECDOCHE or COMPREHENSION takes the Whole for a Part, or a Part for the Whole; a General for a Particular of the same Kind, or a Particular for a General. Thus, when we say, *She has no Colour in her Cheeks*, we take the Whole for a Part; for we mean only Bloom or Redness: And in these Lines a Part in the Word *Roof* is used for the whole House:

His dreaded Pow'r alarms the guilty Soul,  
While o'er his *Roof* th' enquiring Thunders roll.

( \* *Paulus*. † *Annibal*.)

By



By this Trope a round Number is frequently set down for an uncertain :

Your Pride will surely bring you low,

*A thousand Times* I've told you so,

And the plural Number for the singular, by *Virgil* :

Leave Earth, my Muse, and soar a glorious Height,

Tell me what *Heroes* slew the gallant  *Hector*.

Where the Poet only speaks of *Achilles* plurally, to to magnify the Strength, Courage, and Importance of his Hero. And sometimes a collective Word expresses Multitudes with more Clearness and Vehemence than Plurals would do :

While thus he pleaded Virtue's Cause,

The *Theatre* gave loud Applause.

Had it been said, that all the Persons there assembled did so, the Expression had been considerably more depressed and languid.

5. *HYPERBOLE* exceeds the Bounds of strict Truth, representing Things greater or smaller, better or worse, than they really are. This excites Admiration, Love, Fear, or Contempt. For we are apt to magnify what we admire to the Height of Wonder, and to sink what we despise or hate to the lowest Degree of Contempt. There are many Ways of expressing an *Hyperbole* ; but these three are the chief : 1. In plain and direct Terms which far exceed the Strictness of Truth ; as *Virgil* says,

The Giant's lofty Head o'ertops the Clouds.

2. By Similitude or Comparison, as in *Mr. Philips's* Splendid Shilling :

Behind him stalks

Another Monster, not unlike himself,

Sullen of Aspect, by the Vulgar call'd

A *Catchpole*, whose polluted Hands the Gods

With Force incredible and magic Charms

Erst have endu'd ; if he his ample Palm

Should haply on ill-fated Shoulder lay

Of Debtor, strait his Body to the Touch

Obsequious (as whilom Knights were wont)

To some enchanted Castle is convey'd,  
Where Gates impregnable and coercive Chains  
In Durance strict detain him, till, in Form  
Of Money, *Pallas* sets the Captive free.

3. By a strong *Metaphor*, as *Virgil*, instead of saying  
that *Camilla* ran very swiftly, heightens the Expression,  
and makes her fly :

————— *Camilla*

Outstript the Wind in Speed upon the Plain,  
Flew o'er the Fields, nor hurt the bearded Grain ;  
She swept the Seas, and as she skim'd along,  
Her flying Foot unbath'd in Billows hung.

This bold *Trope* should be used with great Caution and  
Judgment ; only in comical Characters and Pieces of Hu-  
mour and Drollery more Liberty is allowable than in  
grave and serious Subjects.

6. *IRONY* intends the Reverse of what it speaks, and  
under the Masque of Praise seems to conceal the most biting  
satyr ; while yet the Character of the Person ironically  
commended, the Air of Contempt which appears in the  
speaker or Writer, and the Exorbitance of the Commen-  
dation, sufficiently discover the Dissimulation :

Your Speech is one Thing, but you mean another ;  
Well done, good Friend, and tender-hearted Brother !

Thus *Dryden* in his *Abraham* and *Achitophel* finely ridi-  
cules the *Egyptian* Worship, by a derisory Commendation  
of their Leek and Onion Gods :

Th' Egyptian Rites the *Jebusites* embrac'd ;  
Where Gods were recommended by their Taste.  
Such savoury Deities must needs be good,  
As serv'd at once for Worship, and for Food !

This Way of Expression has great Force in exposing  
and correcting Vice and Hypocrisy, and dashing Vanity  
and Impudence out of Countenance. Ironical Exhorta-  
tions are a lively and agreeable Branch of this *Trope* ; as  
when you have reckoned up largely the Mischiefs and In-  
conveniencies which attend upon any Practice or Way of  
living, you conclude with feigned Encouragement and  
Ad-

Advice to act after that Manner, or to pursue that very Course of Life. Thus *Horace*, in Mr. *Francis's* Translation :

A Builder hastens with his loaded Team,  
His Porters ; now a Stone, and now a Beam,  
Nods cumbrous Ruin ; jostling Waggons jar,  
With mournful Herdes in tumultuous War ;  
Hence runs a madding Dog with baneful Ire ;  
Thence a vile Pig polluted with the Mire :  
Go then, and bustle through the noisy Throng,  
Invoke the Muse and meditate the Song.

When a dying or dead Person is ironically insulted, is usually called a *Sarcasm*. Thus *Pyrrhus*, the Son of *Achilles*, when the dying *Priam* reproached him with Cruelty, and reminded him of his Father's contrary Behaviour, insults him with this bitter *Sarcasm* :

Thou then be first, replies the Chief, to go  
With these sad Tidings to his Ghost below :  
Begone.—Acquaint him with my Crimes in *Troy*,  
And tell my Sire of his degenerate Boy.

Custom has prevailed to give the same Name to any keen Saying, which has the true Point of Satyr, and cuts deep.

7. CATACHRESIS is an Abuse of Words ; by which we use an improper Term for Want of a proper one, or for the Sake of Boldness and Novelty. Of this *Milton* gives us a beautiful Example in his Description of *Raphael's* Descent from the *Empyrean Heaven* to *Paradise* :

———— Down thither prone in Flight  
He speeds, through the vast *Ethereal Sky*  
Sails between Worlds and Worlds————



### CH A P. III.

WE come now to FIGURES, which are the Language of the Passions. The Impressions of Wonder,  
Love,

Love, Hatred, Fear, Hope, &c. are characterized and communicated by these in the most agreeable Manner.

1. ECPHONESIS, OR EXCLAMATION, is the Voice of Nature Concern and Transport; so Milton:

O unexpected Stroke, worse than of Death!  
Must I thus leave thee, Paradise? thus leave  
Thee, native Soil; these happy Walks and Shades,  
Fit Haunt of Gods! —

2. APORIA OR DOUBT, expresses the Mind's Debate upon some pressing Difficulty; as in this Soliloquy of Dido after the Departure of *Aeneas*:

What shall I do?—What Succour can I find?  
Become a Suppliant to *Hiarbas*' Pride?  
And take my turn to court and be deny'd?  
Shall I with this ungrateful *Trojan* go?  
Forsake an Empire and attend a Foe?  
Or shall I seek alone the churlish Crew?  
Or with my Fleet the flying Sails pursue?—  
Rather with Steel thy guilty Breast invade,  
And take the Fortune thou thyself hast made.

3. EPANORTHOSIS OR CORRECTION, earnestly retracts or calls what had been said or resolved; so Adam in Milton:

————— First and last

On me, me only, as the Source and Spring  
Of all Corruption, all the Blame lights due:  
So might the Wrath—! fond Wish! Could'st thou support  
That Burden, heavier than the Earth to bear;  
Than all the World much heavier?

4. APOSIOPESIS OR SUPPRESSION, breaks off in the midst of Rage or Disturbance suddenly, without expressing one's Mind; notwithstanding which the Meaning is readily understood: Thus angry *Neptune* to the Winds in *Virgil*:

Whom I—but better 'tis to calm the Floods.

5. APOPHASIS OR OMISSION, pretends not to mention what the same it openly declares:

I men-

I mention not his wanton Flights,  
 Luxurious Days, expensive Nights,  
 How deep he gam'd, how much he swore—  
 All this I purposely pass o'er.—

6. APOSTROPHE OR ADDRESS, *turns off from the Subject, and addresses all Things around him; appealing, as were, to Universal Nature for the Justness of his Transport; as Adam in Milton:*

O Woods, O Fountains, Hillocks, Dales, and Bowers,  
 With other Echo late I taught your Shades  
 To answer and resound far other Song!

7. ANASTROPHE OR SUSPENSION, *by describing several Things agreeably, holds the Mind in a pleasing Expectation being further gratified at the Close of the Sentence; as G in his Pastoral called the Squabble:*

Fair is the King-cup that in Meadow blows;  
 Fair is the Daisy that beside her grows;  
 Fair is the Gilliflow'r of Gardens sweet;  
 Fair is the Marigold, for Pottage meet:  
 But Blowzelind's than Gilliflow'r more fair,  
 Than Daisy, Marigold, or King-cup rare.

8. EROTESIS OR INTERROGATION, *asks Questions and returns Answers, as in Conference with his Hearer, Reader or Adversary, or with one's self: Thus the Prince in John Denham's Sophy:*

—Whether shall I, by justly plaguing  
 Him whom I hate, be more unjustly cruel  
 To her I love, or being kind to her,  
 Be cruel to myself, and leave unsatisfied  
 My Anger and Revenge?—But Love, thou art  
 The nobler Passion, and to thee I sacrifice  
 All my ungentle Thoughts.—

9. PROLEPSIS OR PREVENTION, *starts Objections and answers them; as in the following Instance from Dryden's Juvenal:*

What then remains? Are we depriv'd of Will?  
 Must we not ask for Fear of asking ill?  
 Receive my Counsel, and securely move;  
 Intrust thy Fortune to the Pow'rs above.



10. **SYNCHORESIS** or **CONCESSION** grants somewhat, obtain more:

She's fair, has Wit, 'tis true; but then she's vain,  
And false, enough to cure a Lover's Pain.

11. **REPETITION** gracefully and emphatically repeats either the same Word, or the same Sense in different Words; as Prior:

Are there no Poisons, Racks, and Flames, and Swords,  
That *Emma* thus must die by *Henry's* Words?  
Yet what could Swords or Poisons, Racks or Flame,  
But mangle and disjoint this brittle Frame?  
More fatal *Henry's* Words: They murder *Emma's*  
Fame.

12. **PERIPHRASES** or **CIRCUMLOCUTION**, is descriptive of the most Part, and expresses in many Words what might have been said in fewer, either to adorn the Subject, or to avoid some Inconvenience. Thus, instead of saying, 'tis bright Moonlight,' which would not be so poetical, a Poet gives Scope to his Fancy, and says:

The night's bright Empress in her golden Car,  
Darting full Glories from her lovely Face;  
Kindles fresh Beauties in the Eye of *Hesper*.

13. **CLIMAX** or **AMPLIFICATION**, still rises in Sense as it proceeds, till the Period be vigorously and agreeably closed:

Yet while my *Hector* still survives, I see  
My Brethren, Father, Mother, all in thee.  
Alas! my Kindred, Brothers, Parents, all  
Once more will perish, if my *Hector* fall:  
Thy Wife, thy Infant, in thy Danger share,  
Oh! prove a Husband's and a Father's Care!

14. **ASYNDETON** or **OMISSION** of **COPULATIVE**, leaves the Connections of Words, to represent Eagerness or Haste. As *Dido* enraged;

Haste, haul my Gallies out, pursue the Foe,  
Bring flaming Brands, set sail, impetuous row.

15. ENANTIOSIS OF OPPOSITION, *places Things different in View, in order to compare and set them off.*

I the mild Pleasures of the Country love,  
While you the Hurry of the Town approve;  
But what are City Tumults, Strife, and Noise,  
To the calm Sweets which rural Life enjoys?

16. PARABOLE OF COMPARISON, *illustrates one Thing by the just Resemblance which it bears to another:*

— — — — — She never told her Love,  
But let Concealment, like a Worm i' th' Bud,  
Feed on her Damask Cheek: She pin'd in Thought  
And sat, like *Patience* on a Monument,  
Smiling at Grief. *Shakespear.*

17. HYPOTYPOSIS OF LIVELY DESCRIPTION, *strongly and beautifully represents a Thing, as to give a distinct View and satisfactory Notion of it; as in the following Lines of Shakespear:*

I do remember an Apothecary,  
And hereabouts he dwells, whom late I noted  
In tatter'd Weeds, with over-whelming Brows,  
Culling of Simples; meagre were his Looks;  
Sharp Misery had worn him to the Bones:  
And in his needy Shop a Tortoise hung,  
An Alligator stufft, and other Skins  
Of ill-shap'd Fishes; and about his Shelves  
A beggarly Account of empty Boxes;  
Green earthen Pots, Bladders, and musty Seeds,  
Remnants of Packthread, and old Cakes of Roses  
Were thinly scatter'd to make up a Shew.

18. EICON, IMAGE, OR VISION, *represents Things tant and unseen, so as to raise Terror, Wonder, or Compassion.*

— — — — — You, Mistress,  
That have the Office opposite to St. Peter,  
And keep the Gate of Hell! you! you! ay, you  
We have done our Course, there's Money for  
Pains;  
I pray you, turn the Key and keep our Counsel.  
*Shakespear.*

19. PROSOPŌIA personifies, and gives Life to, Things inanimate :

Such an Act,  
That blurs the Grace and Blush of Modesty,  
Calls Virtue Hypocrite ; takes off the Rose  
From the fair Forehead of an innocent Love,  
And sets a Blister there. —

20. ENALLAGE OR CHANGE OF TIME, represents Things as now doing. So Virgil, as translated by Sir John Denham :

Here lay Ulysses, there Achilles, here  
The Battles joined, the Grecian Fleet rode there ;  
But the vast Pile th' amazed Vulgar views,  
Till they their Reason in their Wonder lose ;  
And first Thymetes moves. —

21. CHANGE OF PERSONS also has some Variety, breaking off the Relation, and addressing others. So Gowerley :

Nothing in Nature's sober found,  
But an eternal Health goes round ;  
Fill up the Bowl then, fill it high,  
Fill all the Glasses there, for why  
Shou'd ev'ry Creature drink but I ? —  
Why, Men of Morals, tell me why ?

22. TRANSITION either introduces a Speech abruptly and about Notice,

both turn'd and under open Sky ador'd  
The God that made both Sky, Air, Earth and Heav'n —  
Thou also mad'st the Night,  
Maker Omnipotent ! and Thou the Day ! Milton.

passes to a seemingly different Subject, with which however as some Connection. So Horace in Francis's Translation :

Or if a blacker Crime be known,  
That Crime the Wretch had made his own,  
Who on my harmless Grounds and me  
Bestow'd this luckless falling Tree ! —  
How near was I those dreary Plains,  
Where Pluto's auburn Consort reigns !

Where awful sits the Judge of Hell,  
 Where pious Spirits blisful dwell,  
 Where *Sappho* in melodious Strains  
 Of cruel Calumny complains,  
*Alcæus* sweeps the golden Strings,  
 And Seas and War, and Exile sings, &c.

23. SENTENCE is a lively and instructive Remark upon the Subject, containing much Sense in few Words :

His Stomach fail'd ; his Voice began to pine,  
 And his Flesh waste : Such are the Fruits of Wine !

24. EPIPHONEMA is a Remark with Exclamation at the Conclusion of a Sentence. So *Virgil* by Mr. Pitt :

By yon bright Stars, by each immortal God,  
 His Hands, his Thoughts are innocent of Blood :  
 Nor cou'd, nor durst the Boy the Deed intend ;  
 His only Crime, and oh ! can that offend !  
 Was too much Love to his unhappy Friend.



### General INSTRUCTIONS in the ART PENMANSHIP.

THE various Sorts of Hands, now practised in Great Britain, may be divided into two Branches, namely Those of absolute Use for Business ; and those which are only ornamental. The former are the *Round Hand* and *Italian*, in which most of the common Affairs of Trade and the ordinary Business of Life, are written by all Europeans ; and the *Engrossing* and *Square Text*, in which the various Business of the Law is generally transacted. The other Hands, namely, the *Old English*, the *Roman* and *Italic Prints*, and the *German Text*, are seldom made Use of but by Way of Decoration ; and therefore the Writing of them is but of little Service, and nothing better than a mere Amusement to such as are intended for common Business.

The principal Things to be aimed at, in order to write, or either of the Hands well, are these two: *First*, To get an exact Idea of a good Letter; which is done by frequent and nice Observation of a correct Copy: The other is, to get such a Command of Hand, as to be able to express with the Pen, the Idea upon the Paper; which is attained by constant and careful Practice after the best samples.

*Let ev'ry Day some labour'd Line produce;  
Command of Hand is gain'd by constant Use.*

In order therefore for the more speedy and effectual improvement, I shall shew in the first Place, wherein the Beauty of a masterly Performance principally consists.

1. The essential Properties of a good Piece of *Writing*, are, a due Proportion of Characters throughout the Whole; a just Distance between the Letters themselves as well as the Words; with a natural Leaning or Inclination of the Letters one to another; and a clean smooth Stroke, performed with a masterly Boldness and Freedom, without which the most regular Piece is like a dead Corpse, whose Features, though they may be most exact in Symmetry, want that Spirit which only can render it an Object both valuable and delightful.

2. The Proportion of the several Letters, in most Hands, is generally regulated by the *o* and *n*; let the making of them therefore be first carefully practised, and then the other Letters that are dependent on them: All which must be of the same Width and Fulness of Stroke as they are of.

3. The Proportion and Shape of Letters in any Hand ought to be the same, whether they be written in a large or small Size; let every Hand therefore be first learned in the large Character, which will not only fix the Idea of a good Letter much sooner in your Mind, but also give you a greater Freedom. The Lesser is, doubtless, always contained in the Greater; and he that attains to the writing of the large Hand, however large, may soon write it smaller, if occasion requires.

4. Let all Strokes, which are the constituent Parts of a Letter (or, as some call them, the Body-Strokes) be made with the Full of the Pen, and of the same Thickness



one with another, as near as is consistent with the Nature of the Hand in which you write.

5. Let all Strokes which join the constituent Parts of Letters, or the Letters themselves together, be made with the Corner of the Pen, and as fine as the Hand will admit of; which Strokes must always have some Proportion to the Body-Strokes, and must be thicker, or finer according as the Character is greater or less.

6. Turn not your Pen; neither alter the Position of your Hand, but let it move with a steady, easy Motion, and perform every Letter without Catchings and convulsive Flutterings.

7. Let the fine Strokes answer one another, in a Kind of Opposition; and, in many Hands, run nearly parallel.

8. Let all the Letters that have no Stems above or below the Line be even at the Top and Bottom. Let those which have Stems above the other Letters be equal in Length to the *l*, (the *i*, and a few other Letters in some Hands only excepted). Let those which have Stems below the Line be equal in Length to the *j*, some few excepted.

9. Let the Capital Letters be equal in Height to the little *l*, and a small Matter stronger.

10. Let the Distance between Words be twice as large as that between Letters.

And lastly, let the Lines be of such a Distance, that the Stems of the Letters may not interfere one with another, to prevent which, they must be at least twice the Length of an *l* asunder.



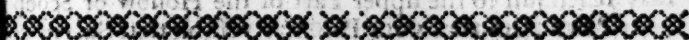
*Of the Choice of PENKNIVES, and QUILLS for the Use of PENS.*

**I**N order to make a good Pen, you must provide a good Knife; or if you have two, one for the *Shaping*, and another for *Nibbing*, you will find the Benefit of it. The Blade be strong and large, you'll find it will take the Nib the cleaner; the Weight of the Blade requiring Pressure: The Edge ought also to be strait, and not keen. The round-pointed Blades hinder the Nibbing

the Pen square ; and if too keen, when nibbing a strong  
pen, the Edge is apt to turn.

As to the Choice of Quills, great Quantities wereof are  
bought from several Counties in *England*, but more parti-  
cularly *Yorkshire*, *Shropshire*, and *Lincolnshire* ; the former  
of these are reckoned the best, as they are the clearest,  
and most substantial.

To make these natural Quills of greater Service, there  
are two Ways of manufacturing them, commonly called  
*nibbing* or *clarifying* them. The first is effected by the  
help of Fire ; the last, by boiling them in Water, and  
then clearing them over a Charcoal Fire, or putting them  
into hot Sand. It may not be amiss here to remove an er-  
roneous Notion which some good Penmen entertain, who  
imagine such Quills to be boiled in Oil ; whereas, if that  
were the Case, the Ink would never flow from them : On  
the other Hand, this Method of clarifying them is to take  
out that oily Matter that is natural to raw Quills, which  
causes a spongy Nib after very little Writing. These Quills  
so manufactured are of longer Duration than raw Quills,  
look better, and are in Reality of more Service for the Dis-  
patch of Business.



*The best Way of making a PEN.*

IN order to make a good Pen, Care must be taken that  
the Slit be not forced so hard, as to gape or open ; nei-  
ther should the Nib be bent inwards ; both these Defici-  
encies tending to the same bad End. The first causes the  
Pen not to cast Ink ; the last, after a very little Use, occa-  
sions a double Stroke ; and when the Nib is recovered from  
that forced Strain, the Slit opens not much unlike that  
which was forced too much. The Slit should be always  
easy and clear. Make each Cheek or Side of the Slit, as  
equal as possible, with a strait-bladed Pen-knife. Nib it  
quite even or square ; the common Practice of making  
that Part next the Hand both narrower and shorter than  
the other, being a vulgar Error : For should the Nib in  
that Part be the narrowest, it must of Course be the weak-  
est ; and if it be the shortest, the other Part of the Nib  
must

must touch the Paper before it, and then you may as well have no Slit at all,

Make the Slit long or short, according to the usual Pressure of your Hand, whilst you are writing; and to the Strength of your Quill.

Take notice, that the manufactured Quills before mentioned have no Need of scraping to make them fit close as the raw Quills have; and they are apt to split too high unless prevented by placing your Thumb at the Height you would have the Slit to stop. The Cheeks are to be made strong in a weak Quill, and weak in a strong one, the principal Judgment, however, lies in the Slitting and the Nibbing. If the Quill be weak, the Slit must be something shorter; if strong, it matters not how long, in case the Cheeks are made in Proportion, so that, if used by an Obedient Hand, it hath a Spring, and opens and shuts with Pleasure; as is evident in Striking, or Command of Hand.

*Directions how to hold the PEN.*

1. Hold your Pen with the Thumb and two first Fingers of your right Hand, so as that your second Finger's End may reach just to the upper Part of the Hollow or Scoop of your Pen. And that your Pen may rest on that Side of your second Finger (near the Nail) which is next your first Finger.
2. Your first Finger's End must reach just to the Top of the Nail of your second Finger, and lay hold or press on that Part of the Barrel of the Pen which is next your second Finger.
3. Your Thumb (almost extended straight) must lay hold or press on that Side of the Barrel of the Pen that is next it, and will then reach to the right against the Top of the Nail of your first Finger.
4. Your Pen and Hand thus ordered, your Pen will be held on the Right Side of it, (almost under the Barrel) to the End of your second Finger near its Nail.
5. On the Right Side (almost on the Back of the Barrel) it will be held by that Part of your first Finger, which is nearest your second Finger.
6. On the Left Side (about an Inch and a Quarter from the Point of the Nib) it will be held by the Ball of the Thumb of your Thumb, travelling slant-wise opposite to the

your Thumb Nail : And the feathered Part of your Pen will pass between the upper and next Joint of your first Finger ; and the hollow Scoop, or Opening of your Pen will be hid from your Sight.

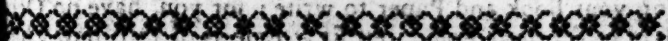
7. The Hollow, or Palm of your Hand, will be almost directly against your Paper.

8. Your third Finger must bear upon your little Finger, near its End ; but it must be brought more inward (or nearer your Left Hand) than your little Finger.

9. Your little Finger must bear on your Paper with that part of it which is next the Nail.

10. The Ball of your Right Hand, near the Wrist, must touch (or any Part of your Hand, but the before-mentioned part of your little Finger) touch the Paper.

11. Your Pen and Hand ordered according to these Directions, you will find the Paper and Desk on which you write will be borne on by nothing else but the Nib of your Pen, the lowermost Joint of your Little Finger, that Part of your Right Arm which is between your Wrist and your Elbow, and by the Thumb, Fingers, and Part of the Arm near the Elbow of your Left Hand ; on which, and the Desk that you sit on, the Weight of your Body should rest.



*Instructions for sitting at your Writing.*

LET your Seat be so high, as that you may sit easy, without either your Legs hanging, or throwing them on you. Let your Desk or Table be about the Height of your Middle. Thus seated, lay your Book or Paper obliquely ; that is, let it incline towards your Left Arm or Side instead of being strait before you. The more it inclines the more your Slope will be. If you write *upright*, then lay your Book or Paper *even* before you. Fix your Body directly before your Desk or Table, with both Right and Left Elbows on it ; notwithstanding the general Method is, that your Left Arm only should rest thereon.

Thus seated, and having your Book and Paper before you, you may write with all the Freedom and Ease imaginable: No *Nervous Flutterings*, no Numbness, or Stiffness, and not a too frequent Sitting with the left Side towards the Desk

Desk or Table, and leaning the Stress of your Body on your Left Arm, occasions, will attend you. This Method suits all Sizes; the Fat, or the Lean; the Tall, or the Short; Men of Bulk, and Ladies daced in their Stature. They will write without Fatigue, and with a great deal of Freedom; and what is more, they will write *even* without *Leading-strings*, either Single or Slope Lines, or any other Aid or Assistance whatsoever.

The Inconveniencies that attend the common Method of sitting are very obvious. There are very few but who find it difficult to write either even, or to keep a Line of an exact Height. The Reason of this is, because, as your Body inclines to the Left towards your Desk, you write from you, which causes you to *fall in the Equality*; if you write without Lines: If you write with them, unless you follow your Writing, it declines at the End of the Line stretching your Hand, and by not being directly under your Eye. Should you move your Body after your Writing is far, your Writing will be come larger at the Close of the Line.

This Method will remedy these and all other Inconveniencies, attending the common Posture in sitting, and laying your Book and Paper to write; for you have no Occasion to stir your Body, but sit at Ease as in an Elbow Chair. Besides, the Fatigue in Writing is lessened, by having both Arms to ease you, laying an equal Weight on the Table or Desk to support your Body; the Right Hand directing the Pen towards the Corner of the Paper; and though it rises a little gradually, that when you come to lay your Paper straight, your Writing will be as even as if performed with Lines. When you have wrote the full Length of the Stretch of your Fingers, your left Hand is employed in drawing the Paper towards your Body, and in pushing it from you when your Line is finished, to begin again.

Observe farther, that he who writes on a flat Table has the Advantage of him who writes upon a Desk that has too great a Slope, because the Ink is apt to recoil; and if the Flow of the Ink is thereby impeded, the Freedom, Beauty and Sprightliness of the Writing must of Consequence be very much hindered, if not wholly lost.



*Particular Instructions relating to the Round Hand and Italian.*

FIRST, the young Penman should endeavour to make his Hand-writing as legible, expeditious, and beautiful as he can; for these three Qualities are what will render it most useful.

In order to render it legible, he should chuse for his Use, of the various Forms that he meets with, such Letters as are most generally known and approved of. He should never, out of a Vanity of Invention, add any rigging to them; neither should he throw Strokes thro' the Body of his small Letters.

To make his Hand-writing expeditious, he should principally use those Letters that are made in one continued stroke, and that have in their Beginnings and Endings an aptness to join with one another.

To make his Writing beautiful, he should make his Strokes and Smalls very smooth and clear; he should make the circular Strokes of his Letters without Corners or Flats; and the right-lined ones, without Crookedness; he should keep such a Distance between his Letters, that the Whites between each of them may be as exact as is consistent with practice, and take the same Care with respect to the Distance of his Words and Lines: For the Beauty of Letters consists in the well-adjusting of their Parts, well-performing the Strokes of which they are composed, and placing them to the best Advantage.

He should take Care, that all such Letters as have no ascenders be made as nearly of a Height as he can; and the Letters in the same Piece of Writing, as near as may be, of the same Proportion; he should perform likewise as much of a Word, as he can in one continued Stroke.

He should never make Use either of a Black or Red Ink or Pencil in striking of his Letters, but should learn to execute them fairly, without touching his Paper with any thing but the Nib of his Pen, and let the Fulls and Smalls be made as the Pen he makes Use of will naturally give them

them, without any After-touches. He should learn the leading Letters of each Hand first, and from them proceed to the others, which in a great Measure depend upon them.

The *Round-Hand* is composed of an oval and strait Line and leans to the Right.

Its Fundamental Letters are *l, n, o, j*. The *Italian Hand* is of the same Nature with the *Round*; with the Difference only, that it is somewhat narrower, for its Slant and Fundamental Letters are the same.



*Directions for nibbing the Pen, and for sitting to write the Law-Hands.*

**M**AKE the Nib of your Pen square, as in the *Round Hand*, but stronger, and shorter in the Slit. Your Writing must be quite upright, sit strait, hold your Elbows out, and have your Parchment always even before you.

The Fundamental Letters of those two Hands are, *j, n, o, w*.

The *German Text* is but little used, except by Way of Ornament; and cannot properly, therefore, be called one of the *Law-Hands*. However, the Letters of it, though they are somewhat narrower than the *Square Text*, stand perpendicular to the Line as that does, and its Fundamental Letters are, *j, o, l, n, w*.

Though 'tis customary, 'tis true, both in the *Square* and *German-Text*, to embellish the Capitals with a Variety of Strokes; yet there are no Rules to be prescribed in the Execution of them, since they are wholly dependent on the Fancy of the Penman; however, he ought to take Care that such additional Strokes be a real Ornament, and not a Blemish to the Letter he would endeavour to improve.



*Directions for Striking, otherwise called Command of Hand.*

**S**TRIKING is called *Command of Hand*, because it is performed without the least Agitation of the Fingers or resting on the Hand or Arm.

Some strike after the *English*, and others after the *Dutch* manner ; and both, if well executed, are beautiful enough when judiciously, and but sparingly introduced ; but a vast variety of Sprigs, Knots, and Birds, &c. are, in the Opinion of the best Performers, no Ornament to Writing at

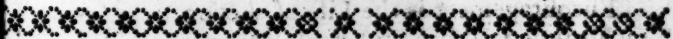
The *English Command* is performed with the Hollow of the Pen turned towards the End of the Middle Finger, and naturally light, airy, and genteel, and most agreeable to the *Italian* and running Round-Hand.

The *Dutch Command* is performed with the Hollow, or Loop of the Pen, held towards the Ball or Hollow of the Hand, and is most proper for Letters in the Round-Hand, because the Fulls fall alike ; the Pen being held as in Writing, only the Nib a little elevated.

The Center of Motion in Striking, is at the Shoulder, from whence let your Hand and Arm swing together with sprightly Motion, without resting, or touching the Paper with any Thing but the Pen, which must not be turned the Hand whilst you are making of any Stroke.

The slower your Motion is, the surer it will be ; but there must be such a Boldness and Freedom observed, that the Stroke may be smart and clean, without Roughness, Flatness, or Corners.

Note, The Pen for *Dutch Command of Hand* is the same with that for the *Round-Text* ; and for the *English Command*, the same with that for the *Italian-Text*.



*Directions for the making of Figures.*

THE making of Figures well, is as necessary, as the making of Letters well ; for without Figures, no Affairs in common Business can possibly be transacted ; and that Reason I would advise all such as would be thought qualified for any Employment whatsoever, to make their Figures in the most graceful Manner that they can. Figures, that stand in Columns in Books of Accompts, must be upright ; but if they are mixed with Letters in Writing, let them lean.

\*\*\*\*\*

**W**RITING-MASTERS should not give their Scholars idle, silly Copies, which have no Sense in them, but such as inculcate Virtue; for what we learn in our younger Years, sinks deep in the Memory, adheres to us till old Age, and has a prevailing Influence over all our Conduct. In the Prosecution, therefore, of these Directions, I shall make it my Business to extract, from the Writing of the politest and most approved Authors, both Antient and Modern, such sententious Precepts, and Rules of Life, both in Prose and Verse, as may be not only proper for my young Pupils Imitation and Improvement in the Art of Penmanship; but, if committed in the Memory, may prove a Guide for their future Conduct, and may contribute, in some Measure, not only to their Success here, but their Happiness hereafter.

*Select Copies, consisting of single Lines, and digested into Alphabetical Order.*

FIRST SET.

- A. **A**R.T polishes and improves Nature.
- B. Beauty's a fair but fading Flower.
- C. Content alone is true Happiness.
- D. Delays often ruin the best Designs.
- E. Encouragement is the Life of Action.
- F. Fortune is a fair, but fickle Mistress.
- G. Grandeur alone is no true Happiness.
- H. Health is Life's choicest Blessing.
- I. Idleness is an Inlet to every Vice.
- K. Knowledge is a godlike Attribute.
- L. Liberty is an invaluable Blessing.
- M. Modest Merit finds but few Admirers.
- N. Necessity is the Mother of Invention.
- O. One bad Sheep infects the whole Flock.
- P. Pride is a Passion not made for Man.
- Q. Quick Resentments prove often fatal.
- R. Riches are precarious Blessings.
- S. Self-Love is the Bane of Society.

- T. The Hope of Reward sweetens Labour.  
 V. Variety is the Beauty of the World.  
 W. Writing is a fine Accomplishment.  
 X. 'Xcess kills more than the Sword.  
 Y. Yesterday mispent can never be recall'd.  
 Z. Zeal misapplied is pious Phrensy.

SECOND SET.

- A. Affectation ruins the fairest Face.  
 B. Beauties very seldom hear the Truth.  
 C. Conscious Virtue is its own Reward.  
 D. Dreams are the Pastimes of Fancy.  
 E. Envy too often attends true Merit.  
 F. Fame, once lost, can never be regained.  
 G. Good Humour has everlasting Graces.  
 H. Humility adds Charms to Beauty.  
 I. Innocence is ever gay and cheerful.  
 K. Knowledge procures general Esteem.  
 L. Love hides a Multitude of Faults.  
 M. Modesty charms more than Beauty.  
 N. Nothing is more valuable than Time.  
 O. Order makes Trifles appear graceful.  
 P. Praise is grateful to human Nature.  
 Q. Quick Promisers are often slow Performers.  
 R. Recreations are not only lawful, but expedient.  
 S. Shame attends unlawful Pleasures.  
 T. Truth needs no Disguise or Ornament.  
 V. Vanity makes Beauty contemptible.  
 W. Wisdom is more valuable than Riches.  
 X. 'Xamples prevail more than Precepts.  
 Y. Youth, like Beauty, very soon decays.  
 Z. Zeal warms, and enlivens Devotion.

Select Sentences, Moral and Divine, alphabetically digested.

THE FIRST SET.

A. A Man of great Abilities may, by Negligence and Idleness, become so mean and despicable, as to be an Incumbrance to Society, and a Burden to himself.



B.

Beware of Drunkenness. It impairs the Understanding, wastes the Estate, banishes the Reputation, consumes the Body, and renders a Man of the brightest Parts, the common Jest of an insignificant Clown.

C.

Contentment is the most precious Jewel of human Life, and the Way to attain it is, the surmounting Difficulties by curbing vicious Inclinations, fierce unruly Passions, and inordinate Appetites, in overcoming Temptations, and bearing Injuries with Patience.

D.

Disdain not your Inferior, though poor; since he may possibly be much your Superior in Wisdom, and the noble Endowments of the Mind.

E.

Envious Persons are for the most Part ungrateful, mean, proud, impotent, and malicious: They lie under a double Misfortune; Common Calamities and common Blessings fall heavy upon them: Nature gives them a Share in the first and their Ill-Nature in the latter; and having their own Trouble, and the Happiness of their Neighbours disturb them, they need no other Ingredients of Misery.

F.

Fame and Opportunity have swift Wings; and the Difference is, that the former goes forward, but the latter backwards: She must therefore be taken by the Forelock, for Occasion past is irrecoverable, and the Loss by Neglect is irreparable.

G.

Good Books are a Guide in Youth, and an Entertainment for Age; they support us under Solitude, and keep from being a Burden to ourselves: When we are weary of the Living, we may repair to the Dead, who have nothing of Peevishness, Pride, or Design in their Conversation.

H.

He that neglects Religion, to pursue the vain Pleasures of Life, makes his Address to a Shadow; and the more he pursues the admired Trifle, the more it flies from him.

I.

Idleness is the greatest Prodigality; it throws away Time, which is invaluable in respect to its present Use;

when it is past, cannot be recovered by any Power of Art or Nature.

**K.**

Keep your own Secrets; for if you discover them to another, and he reveals them, you should pardon him for it, since he is only treacherous by your Example.

**L.**

Let Virtue and Innocence always accompany your Re-creations; for unlawful Pleasures, though agreeable for a Moment, are always attended with bad Consequences, and, instead of relaxing the Mind, plunge us into an Abyss of Trouble and Vexation.

**M.**

Much Prudence is required in the Choice of your Companions: If you desire Refreshment, associate yourself with your Equals; but if Profit with your Superiors. It is always the sure and certain Mark of an abject Temper, to be ambitious of being the first of any Company whatsoever.

**N.**

Necessity is the Mother of Invention, and Encouragement the Nurse of it: What is brought forth by the one, could be propagated by the other.

**O.**

Observe the various Actions and Tempers of Men and of all by human Infirmities with a generous Greatness: Criticise upon nothing more than your own Actions, and you'll have Reason enough to pardon the Weakness of others.

**P.**

Pride hides our Faults from ourselves, and magnifies them to others: It will make a Man dictate to his Superiors, of whom he ought to learn; and rather than not appear wise, chuse to continue ignorant.

**Q.**

Quarrels are too often raised about the meekest Trifles; and yet, when once begun, are with the greatest Difficulty imaginable brought to a friendly Conclusion.

**R.**

Reputation is like Fire; when once you have kindled it, you may easily preserve it; but, if once you extinguish it, it will not easily kindle it again; and if you should, it will burn a little, but it will never blaze.

**S.**

S.

Shame, Diseases, Disappointments, and self-condemning Reflections, are the common Punishment of Sloth: But Success and Riches generally attend an unwearied Diligence and Application to Business.

T.

The best need Afflictions for the Trial of their Virtues. Should all Things succeed to our Wishes, how should we shew our Readiness to forgive others; as we ourselves desire to be forgiven?

U.

Use your Prosperity with so much Caution and Prudence, as may not suffer you to forget yourself, or despise your Inferior; and consider, whilst you enjoy much, how little you deserve.

W.

We may as well expect, that God should make us rich without the least Diligence or Application, as make us good, without the Concurrence of our own Endeavours.

X.

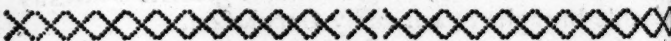
'Xcess destroys more than the Sword, *Alexander*, who inflamed with Wine, cut off his best Friend, and executed in one unguarded Moment what he repented of all his Life after.

Y.

Youth is rash and precipitant: Whilst the Blood runs thro' the Veins with great Rapidity, the Passions are strong and unruly, and the Mind too loose and airy to be guided by the wise Counsel of the aged; and the Knowledge of themselves, comes often too late to prevent their Ruin.

Z.

Zeal, when grounded upon Knowledge. and guided by Prudence and Charity, gives such a Life and Vigour to Devotion, that all who see it so exerted must applaud it.



*Select Copies in easy Verse, alphabetically digested.*

A.

**A**LL human Things are subject to decay,  
And when Death summons, Monarchs must obey.

B.

Brave Deeds, and Virtue (when 'tis spotless) have,  
Glorious Rewards, that shall out-live the Grave.

C.

Censure not rashly ; Nature's apt to halt :  
Look inward : He's unborn that has no Fault.

D.

Do thou with Pleasure own thy Errors past,  
And let each following Day excel the last.

E.

Envy will merit, as its Shade, pursue ;  
But, like a Shadow, proves the Substance true.

F.

First worship God : He that forgets to pray,  
Bids not himself Good-Morrow, nor Good-Day.

G.

Greatness by Virtue's only understood :  
Not one is truly great, that is not truly good.

H.

He's rich who never covets worldly Pelf ;  
He's poor, who has enough and starves himself.

I.

Immodest Words admit of no Defence ;  
For Want of Decency is Want of Sense.

K.

Know this one Truth, (enough for Man to know)  
Virtue alone is Happiness below.

L.

Live well, and then how soon soe'er you die,  
You are of Age to claim Eternity.

M.

Manners with Fortunes, Humours change with Climes,  
Tenets with Books, and Principles with Times.

N.

No Minutes surely bring us more Content,  
Than those in pleasing, useful Studies spent.

O.

Our Reformation never can prevail,  
While Precepts govern, and Examples fail.

P.

Pride is the never-failing Vice of Fools,  
The Wise and Virtuous walk by humble Rules.

Q.

Q.

Quarrels, and Strife, and Law-Suits wisely shun :  
By Peace and Silence, no Man is undone.

R.

Remember Death ; think every Day your last ;  
Lament all Vanities and Follies past.

S.

Safe in thy Breast close lock up thy Intent ;  
For he that knows thy Purpose, best prevents.

T.

They cannot want who wish to have no more :  
Who ever said an Anchorit was poor ?

V.

View all the habitable World ! How few  
Know their own Good, or knowing it pursue.

W.

Want is the Scorn of every wealthy Fool,  
And Wit in Rags is turn'd to Ridicule.

X.

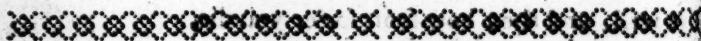
Xerxes survey'd his mighty Host with Tears,  
To think they all must die in threescore Years.

Y.

Yesterday's past ; To-morrow's none of thine :  
To-day thy Life to virtuous Acts incline.

Z.

Zeal is a Fire, and useful in its Kind :  
But nothing is more dangerous, if blind.



*Select Sentences, Moral and Divine, in Prose, alphabetically  
digested,*

The SECOND SET,

A

**A**CTION keeps the Soul in Health ; whereas Idleness rusts the Mind, and corrupts as well as benumbs all its active Faculties.

B.

Beware of the Man that has no Regard to his own Reputation ; since it is not probable he should have any for years.



C.

Could we rightly and duly reflect on the Misfortunes of other Men, we should be much more thankful than we are for the many undeserved Blessings which we daily enjoy.

D.

Do not speak reproachfully of any Person whomsoever : for such Injuries are very seldom, if ever, forgotten, and may possibly prove a Hindrance to your Preferment.

E.

Education either makes or mars us ; and Governments, as well as private Families, are concerned in the Consequences of it.

F.

Faith may sometimes exceed Reason, but not oppose it ; and Belief may be often above Sense, tho' not against it : Beware therefore not only of an implicit Faith, but of being too closely tied up to Reason, where Faith is required.

G.

Give your Heart to your Creator ; pay due Reverence to your Superiors ; honour your Parents ; give your Bosom to your Friend ; be diligent in your Calling, let your Condition of Life be what it will ; give an attentive Ear to good Advice ; and be liberal to the poor.

H.

Humility is the grand Virtue that leads to Contentment : It cuts off the Envy and Malice of Inferiors and Equals, and makes us patiently bear the Insults of Fools above us.

I.

If you would avoid Sin, fly Temptations ; he that will not use his utmost Endeavours to avoid the one, cannot expect Providence should defend him from the other.

K.

Keep a just Account at the Entrance of your Estate : You may rise with Honour, but you cannot go back without shame ; for a good Beginning makes a good Ending.

L.

Let your Promises be sincere, and so prudently considered, as not to exceed the Reach of your Ability : He who promises more than he can perform is false to himself ; and he who does not perform what he has promised is false to his Friend.

M.

M.

Make not your Neighbour's Fault appear greater than it is, nor your own less; for to excuse your own Fault is to double it, and to aggravate another's by Detraction, is to make it your own.

N.

Nature is nothing but the Voice of God: A bright Display of that divine Wisdom, which demands an eternal Tribute of Wonder and Worship.

O.

Our present Time ought to be managed with a judicious Care; since we cannot secure a Moment to come, nor recover the least Part of one that is past.

P.

Put forth all your Strength in honouring of God, and doing his Commandments; for that Time shall end in blessed Eternity, that is prudently and zealously spent in the Service of the Supreme Being.

Q.

Quietness carries its own Reward along with it. Have an Aversion to all Debates; study to inform your Mind and reform your Life.

R.

Recreation after Business is allowable; but he that follows his Recreation instead of his Business, shall in a little Time have no Business to follow.

S.

Solon made a Law that those Parents should not be neglected in their old Age by their Children, who did not take Care to give them a virtuous Education.

T.

That Man who fears God is the wisest Man; and he that departs from Evil has the best Understanding.

V.

Virtue is the Beauty of the Mind, and the noblest Ornament that Mankind can boast of. It stirs up our Reason when our Senses err, and is then our greatest Safeguard.

W.

Whoever wisely considers the Miseries of human Life will certainly prepare for a better; since Infancy is attended with Weakness, Youth with Disorder, and Age with Infirmity.

X.

Excuse what you see amiss in others since all Mankind  
is liable to Errors.

Y.

Your Poverty will never prove a Disgrace to you, unless  
you hasten to be rich by any illegal Proceedings.

Z.

Zeal in a good Cause is very commendable; but when-  
ever it is blind or neglected, it is very pernicious.



*Select Copies, consisting of four, six and eight Lines.*

I.

BEAUTY, like Ice, our Footing does betray;  
Who can tread sure on that smooth slippery Way?  
As'd with the Passage, we slide swiftly on,  
And see the Danger, which we cannot shun.

II.

There is a Lust in Man no Charm can tame,  
Loudly publishing his Neighbour's Shame;  
Eagle's Wings immortal Scandals fly,  
While virtuous Actions are but born and die.

III.

True's the chiefest Beauty of the Mind,  
The noblest Ornament of Human-kind;  
True's our Safeguard, and our leading Star,  
That guides our Reason when our Senses err.

IV.

Children, like tender Oziers, take the Bow,  
And as they first are fashion'd always grow:  
What we learn in Youth, to that alone,  
In Age we are by second Nature prone.

V.

Who did first the wond'rous Art devise,  
Painting Words, and speaking to the Eyes;  
Various Lines to curious Order brought,  
By and Colours were giv'n unto Thought.

VI.

None, none descends into himself, to find  
The secret Imperfections of his Mind.

But

But ev'ry one is Eagle-ey'd to see  
In any other a Deformity.

## I.

Great was that Genius, most sublime that Thought,  
Which first the curious *Art of Writing* taught :  
This Image of the Voice did Man invent,  
To make Thought lasting, Reason permanent :  
Whose softest Notes with Sarcasmy can roll,  
And Mysteries proclaim from Pole to Pole.

## II.

Happy the Man, of Mortals happiest he,  
Whose quiet Mind from vain Desire is free :  
Whom neither Hopes deceive, nor Fears torment,  
But lives at Peace, within himself content ;  
In Thought or Act accountable to none,  
But to his Conscience, and to God alone.

## I.

Dreams are but Interludes which Fancy makes,  
Whilst Monarch Reason sleeps the Mimick wakes ;  
Compounds a Medley of disjointed Things,  
A Court of Coblers, and a Mob of Kings.  
Light Fumes are merry, grosser Fumes are sad,  
And both the reasonable Soul run mad ;  
And many monstrous Forms in Sleep we see,  
That never were, nor are, nor e'er shall be,

## II.

Such is the gloomy State of Mortals here,  
We know not what to wish, or what to fear,  
What then remains ? Are we deprived of Will ?  
Must we not wish for fear of wishing Ill ?  
Receive my Counsel, and securely move ;  
Entrust thy Fortune to the Pow'rs above :  
Leave them to manage for thee, and to grant  
What their unetring Wisdom sees Thee want.



*The Care of forming the MANNERS.*

**I**F Learning, Eloquence, and the Knowledge of Business were the only Ends of Instruction, it would by

*The Care of forming the Manners.* 61

means lead us to that great Purpose for which we came to the World. 'Tis easy to discern, that Man is not made for himself only. He is a Member of Society, and, as in a Concert of Music, must qualify himself to perform a Part, that the Harmony may be perfect. The Employments of the State are those which require the brightest Talents, and the most advanced Degrees of knowledge. These give the Movement to the whole Body, and more directly influence the public Happiness. Virtue alone can enable us to discharge them with Credit. The good Dispositions of the Heart constitute real Merit, and make us fit Instruments for promoting the common Welfare. These are the Ends which good Masters have all in View in the Education of Youth. The Sciences of small Value, unless they lead to Virtue. Erudition trifling, or mischievous, unattended with Probity. They prefer, therefore, the honest Man to the Learned; and bring before their Scholars the most beautiful Passages of Antiquity, strive less to enlarge their Capacity than to make them virtuous, good Children, good Fathers, good Friends, and good Citizens.

Without this, of what Use would our Studies be? The principal End of Education and Instruction is, to make us better. The Preceptor who departs from this Rule, serves not the Esteem and Approbation of the Public. *Pericles* governed *Athens* with great Reputation. He filled it with Temples, Theatres, Statues, famous Monuments, and Ornaments of Gold. He drew thither whatever was curious in Sculpture, Painting, and Architecture, and fixed the Model and Rule of polite Taste for all Posterity. But, says *Plato*, can they name one single man whom *Pericles* made wiser or better by all his Care? On the other Hand, his Conduct did indeed cause the *Athenians* to degenerate, rendered them idle, effeminate Babblers, Busy Bodies, fond of Expence, and Admirers of Vanity and Superfluity. He concludes it therefore wrong to employ his Administration so exceedingly. Apply this to the Study of the Sciences. It teaches us to look upon them, not as our End, but as the Means that lead to it. The End is Virtue. That which is to make us serviceable to all Men, and happy for ever. Towards this the Sciences are very useful Instruments; and the Use which we



ought to make of them is, by a proper Application of the Maxims, Examples, and remarkable Stories which Authors furnish, to inspire young Persons with a Love of Virtue and a Detestation of Vice.

The few good Inclinations that we have are clouded by an unhappy Disposition to Ill, transmitted from our first Parents. Teachers should, therefore, be always on their Guard, to encourage and strengthen those faint, but precious, Remains of our first Innocence, and pluck up with indefatigable Care, the Thorns and Briars which are continually shooting up in so bad a Soil. Youth have Need of a faithful and constant Monitor, an Advocate who shall plead with them the Cause of Truth, Honesty and Right Reason; who shall point out the Mistakes that prevail in most of the Discourses of Mankind, and lay before them certain Rules for their Detection. To heal or preserve them from, the Contagion of the present Age, we must convey them into other Countries and Times, oppose the Opinions and Examples of Antiquity, spoken of by the Authors which they read, to the false Principles and evil Examples, which debauch the greater Part of Mankind. What was said by a *Camillus*, a *Scipio*, and a *Cyrus*, will be listened to; and Instructions thus concealed will make a deep Impression. The Taste of real Glory languishes. All Merit and Honour is now made to consist in the Magnificence of Buildings, Furniture, Equipage and Tables. To this we may oppose Dictators and Consuls from the Plough, whose Hands, made hard with Labour, saved and supported the sinking Commonwealth. They refused the offered Gold, and chose rather to rule over those who had it, than to possess it themselves. Many of them who managed the public Treasures, yet at their Death left not enough to bury them. In such Honour was Poverty, and so despised were Riches! They had no great Skill in Entertainments; but knew how to conquer their Enemies in War, and to govern their Citizens in Peace. Magnificent in their public Buildings, and declared Enemies of Luxury in private Persons, they contented themselves with moderate Houses, which they adorned with the Spoils of their Enemies, and not of their Countrymen.

*Augustus* raised the *Roman* Empire to an higher Pitch of grandeur than it had known before. He could boast, that he should leave the City all of Marble, which he found all Brick. Yet during a Reign of more than forty years he departed not from the modest Simplicity of his ancestors. His Palaces were plain, and his constant Furniture correspondent. He lay always in the same Apartment; and his Cloaths were generally such as the Empress *Livia* or his Sister *Octavia* spun for him. Such Passages make an Impression upon young People. They lead to the same Reflections which *Seneca* made upon the Baths of *Scipio*. 'Tis a great Pleasure, says he, to compare the manners of *Scipio* with ours. That great Man, the Terror of *Carthage* and the Boast of *Rome*, had manured his Field with his own Hands, and could walk himself in an obscure Corner; could lie under a small Roof, and be content to have his Rooms floored with a sorry Pavement. Who would now be satisfied to live as he did? Every one looks upon himself as poor and sordid, whose Magnificence extends not even to his Baths. How glorious is it to see *Cato* upon a single Horse, unattended, and his Bag behind him? What Lecture can be more useful than such Reflections? How weighty are the Words of the same *Scipio* to *Masiusa*, "There is not, (believes me), he, "so much Danger to Persons of our Age from Enemies in Arms, as from the Pleasures which on every side beset us. He who hath curbed and subdued these by his own Temperance, hath gained for himself more Honour and a greater Conquest, than we have obtained by our Victory over *Syphax*." He had a Right to talk thus after the Example of Continnence which he had shown some Years before. A young and beautiful Princess been brought to him among his Prisoners. On Information that she was promised in Marriage, he caused her to be guarded with all Care and Caution. When her time came, he gave her back into his Hands, with a Discontent full of that Greatness and noble *Roman* Spirit, which is now scarce any where to be met with but in Books. To attest the Generosity of the Action, he, at the same time, added to her Fortune the whole Ransom which her Parents brought for the Redemption of their Daughter.

64 *The Care of forming the Manners.*

Such was the Gallantry of this *Roman*, then in the Prime of Life, unengaged, and flushed with Conquest!

By these Instances young People are instigated to a Taste for Virtue: They learn to place their Admiration upon real Merit; to overcome Prejudices, and pass an upright Judgment upon Men and Things; to prefer true Bounty and Liberality to the most glittering Actions without Solidity, and to know that a Service generously done to a Friend in Distress, has the Advantage of the most glorious Victories. *Cicero*, in an Oration, lays open on the one Side the military Virtues of *Cæsar*. He displays them in full Light, and represents him not only superior to his Enemies, but as the Conqueror of the Seasons also. On the other Hand, he describes the generous Protection which the same *Cæsar* had granted to an old Friend fallen into Disgrace and reduced to Penury. Upon weighing these different Qualities in the Balance of Truth, he pronounces in Favour of the latter. "This," says he,

"was an Action truly great and worthy of Admiration."

"And, in my Opinion, *Cæsar's* Regard for the Miserable

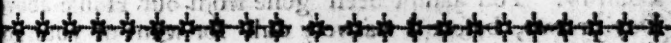
"tunes of a poor old Friend, when raised to so high a

"Station, ought to be preferred to all his other Virtues."

I shall conclude these Remarks with a Passage in *Euripides*, very proper to instruct young Gentlemen. *Euripides*, the *Lacedæmonian*, Generalissimo of the *Greek* Allies on Board the Fleet sent against the *Persians*, not bearing that *Themistocles*, the *Athenian* Chief, who was but a Young Man, should so stiffly oppose his Opinion, lifted up his Canes as a Passion, and threatened to strike him. What would our young Officers have done upon such an Occasion? *Themistocles*, without any Concern, said, "Strike and I will come, so you will but hear me." Surprised at his Coolness, *Euripides* did indeed hear him, and following his Advice, gave Battle in the Streights of *Salamis*, and obtained that famous Victory, which saved *Greece* and crowned *Themistocles* with immortal Glory. An understanding Teacher knows how to make his Advantage of such an Occasion. He will not fail to observe to his Pupil, that neither amongst the *Greeks* nor *Romans*, the Conquerors of so many Nations, and who certainly were very good Judges of a Point of Honour, was there so much as one single Instance of a private Duel, in which a general

course of so many Ages. This barbarous Custom, which now called Nobleness and Greatness of Spirit, was entirely unknown to those celebrated Judges of true Glory. They reserved, says *Salust*, their Hatred and Resentment for their Enemies, and contended only for Glory and Virtue with their own Countrymen."

It is justly observed, that Nothing is more apt to inspire Sentiments of Virtue, and to divert from Vice, than the Conversation of Men of Worth. It makes an Impression by Degrees, and at Length sinks deep into the Heart. And this Advantage is chiefly to be drawn from the Reading of Authors of established Merit. It forms a Kind of Relation between us and the greatest Men of Antiquity. We converse with them; we travel with them; we live with them; we hear them discourse, and are Witnesses of their Actions. We enter insensibly into their Principles and Opinions; and we derive from them that noble Greatness of Soul, that Disinterestedness, that Hatred of Injustice, and that Love for the public Good, which make so bright a Figure in every Passage of their Lives.



*General Directions in regard to Epistolary Writing; with Select Forms of Address and Business.*

THE Style peculiar to such Letters as consist only of Compliment, Wit, and Address, should be always indeed, but free and easy, void of all studied Graces and as near a Copy of Nature as possible.

On the other Hand, That of the Tradesman should be short, plain, and pertinent to the Occasion, without any flights of Fancy, or Deviations from his principal Design. He should imagine himself in Conversation with his Friend at the *Royal Exchange*, and express his Sentiments in such plain Terms, that his Correspondent should not be capable of the least Doubt or Hesitation with respect to his Orders. And as he ought never to be obscure, so he should industriously avoid all Manner of Abbreviations, which have a natural Tendency to render his Expressions either too general, or ambiguous. Nothing therefore in his Letter



ter should be presum'd, understood, or implied. His Intentions should be comprehended at the first View; whenever Instructions are given but darkly, and by Hint only, some Error of Consequence may pass through Misconstruction.

The Correspondent, likewise, on his Part, should take particular Care to be as punctual, clear, and free from Ambiguity, in all his Answers. He should weigh every Article maturely, and give it a distinct and direct Reply. Nothing, in short, should be omitted; no one Particular should be left in Suspence, lest his Correspondent, for want of proper Intelligence, should suffer either in his Character or his Fortune.

### LETTER I.

*From one Cousin to another.*

*Dear Cousin Polly,*

**T**IS with no small Pleasure that I write to you the joint Command of my Papa and Mamma to enquire after your Health, and all our other Relations in the Country. You hadn't been gone from our House above Day or two, before I was very dull for want of your good Company. However, as I know you have not your Health in our nasty smoaky Town, it would be very unkind of me to desire you to return, and run the Risque of a second Illness. Pray let us know how you spend your Time in the Country, and in Return, you may expect to hear what passes at our next Ball here in Town, which will be very gay, and comes on in about a Fortnight. I am,

*Your affectionate Cousin,*

T. D.

### LETTER II.

*Miss Polly's Answer.*

*Dear Cousin Tommy,*

**I** Had the Favour of your friendly Letter, and am greatly obliged to you, Sir, as well as to your good Papa and Mamma, for enquiring after my Health. I am much better since I came into the Country; and Mr. Mearns, the Apothecary, gives me Hopes of a speedy Recovery.



go abroad every Day to divert myself; but the Woods and Gardens are not near so chearful and inviting this Spring, as they were the last, when we had the Pleasure of your good Company. However, as your Papa has now bought you a little Poney, and the Weather is like to continue fine, I please myself with the Thoughts of seeing you in a few Days; for I don't at all doubt but the Letter sent by *William* will procure the Consent of my good Uncle and Aunt, and I have Reason to believe, Sir, that you will be willing to pay a Visit to

*Your affectionate Cousin, M. G.*

LETTER III.

*From a Brother in Town to his Sister in the Country, complaining of her Neglect in Writing.*

*Dear Sister,*

YOUR Friends, I can assure you, take it very ill, that you give them no Account of your Health, or the Manner in which you spend your Time in the Country. You cannot be insensible, that you have several Admirers here in Town, and that they are impatient for your Return. Can your long Silence, therefore, think you, be any ways excused with a good Grace? My Mother, I can tell you, is highly displeased, and so are my Uncle and Aunt. For my Part, I have acted the good-natured Brother so long, and formed so many Excuses for you, that I am quite tired. Take Care therefore for the future, and deserve a better Character. Write to us soon and often, and I don't doubt but I shall procure your Pardon for the offences past. You may depend on it, that 'tis with no small Pleasure that I subscribe myself,

*Your affectionate Brother, E. D.*

LETTER IV.

*The Sister's Answer.*

*Dear Brother,*

THE Charge you have brought against me is, I own, a little too just. I have been negligent indeed; but I can assure my dear Mother, and my Uncle and Aunt, that my Silence has not been owing to the least Want of Duty or Respect, and that I'll never be guilty of the like Fault again. Be my Advocate, dear Brother, for once, upon

upon this my sincere Promise of Amendment. I know you are good-natured, and that my Relations, if you but please in my Behalf, will sign my Forgiveness. If you'll excuse the Shortness of this Letter, you shall have a longer next Week, with a full and true Account of my Visit to my Lady Notable, and the kind Reception I met with from the whole Family. I have nothing to add at present but my Duty and Respects where due, and to assure you, that I am proud to subscribe myself,

*Your affectionate and much obliged Sister, E. D.*

### LETTER V.

*From an elder to a younger Brother, representing to him the fatal Consequences that must unavoidably attend him, if his Case be persists in his Extravagance.*

*Dear Billy,*

**A**S you are my only Brother, you must imagine, if I give yourself the least Time for Reflection, that your Misfortunes affect me next to my own. You are sensible I have met with too many; but then you know very well at the same Time, that they must be ascribed to unforeseen Accidents, and not to any wilful Acts of Profusion. The Consideration supports me under the Weight of them; but as to those that have befallen me on your Account, they must be imputed indeed to my Indiscretion. When my Father and Mother were living, they both supplied you not only with the Conveniences of Life, but indulged you if I may be so free as to say so, in your Levity and Extravagance. They are both dead, and what they left behind them, 'tis true, is now devolved upon me. Not only Nature, but Providence, directs me to make the best Use I possibly can, of what is thus thrown into my Possession. My Love for you inclines me, I must own, to serve you to the utmost of my Power; but, dear Billy, which Way do I effectually do it? The frequent Supplies that our indulgent Parents sent you, gave you no substantial Assistance: they were thrown away upon you: And what Measure may I pray, am I to take to screen you from Distress? You may have been happy long ere this, had you made but a good Use of your Friends Readiness to serve you; but give me leave to speak by Sentiments freely, your present melancholy Situation is wholly owing to your own Imprudence.

you might have lived comfortably, with good Management, all your Life-time, on your own Fortune; but 'tis plain, it has not maintained you much above a Twelve-month. Were I able, or willing to add as much more to it, what just Grounds have I to expect that you will be a better Oeconomist than hitherto you have been? All I have, at your Rate of living, would support you, Brother, but a very few Years; and I must think it my Duty (whatever you may imagine) to take care of my own Family as long as they live, and am determin'd so to do, if no unforeseen Accident prevents me. Were I to send you the hundred Guineas according to your Request, of what real Advantage would it be to you? It would prove of no other service in the World, than to lengthen your Credit, and make you run deeper into Debt. How often have I assisted you already? And has not the Case been always the same? Have not several with whom you have Dealings, given you Credit from Time to Time, because they imagined that I would support you, and discharge their Bills? Is therefore all my Indulgence towards you has proved ineffectual, 'tis Time now to withdraw my Favours. However, notwithstanding all your repeated Provocations, you may assure yourself, when I have any convincing Proof of your Reformation, no reasonable Assistance will be denied you, by

*Your affectionate, tho' much injur'd Brother,* A. Z.

## LETTER VI.

*From a Guardian to his Ward, on his irregular Course of Life during his Apprenticeship.*

*Dear Dicky,*

YOU are not insensible of the true Love and Friendship that always subsisted between your affectionate Father and myself: And as he was pleased to constitute me the sole Executor of his last Will and Testament, and therein charged me, in the warmest Terms, to have a watchful Eye over your Deportment during your Minority, 'tis with the utmost Concern, that I hear you have entered yourself a Member of a loose disorderly Club; that you have too little Regard for your Reputation; are often disguised in Liquor; keep bad Hours, break the Rules

Rules of your Master's House at least twice a Week; and in short, make the whole Family very uneasy. I have been informed, moreover, that, if my old Friend does but expostulate with you on the Occasion, even in the coolest Manner, you treat him with that Indecency that your Ways becomes you: You give him, it seems, such peremptory Answers, and put on such saucy Airs, as are insufferable; and, in short, instead of being submissive, and giving him the least Prospect of a future Amendment, you repeat the Offence for which he checks you, and make his wholesome Admonitions the Topic of your Ridicule amongst your profligate Companions.

As this is the true State of the Case; and as your good Father has been pleased to invest me with an Authority over you during your younger Years, give me leave to expostulate with you on this unhappy Occasion, and set before you, in a fair and impartial Light, the fatal Consequences that must too soon attend you, without a speedy Reformation.

In the first Place, how can you, in Conscience, break through all those Laws which you had so voluntarily bound yourself, by the most solemn Contract, faithfully to observe? How can I, think you, look your Master in the Face, who stands engaged to him in a very considerable penal Sum for your Integrity and good Behaviour? Can you think it honest to violate such Engagements? Consider you are but Eighteen, and 'tis Time enough in Conscience, when you are One or Two and Twenty Years of Age, to be your own Master, and act without Controul. Stay till then at least, before you take such unreasonable Liberties, and keep such bad Hours, as well as bad Associates. And, in case you go on as you begin, I have too just Grounds to fear, you will even then prove equally indiscreet, and have a Taste for the same vicious Course of Life.

Consider, I beg of you, before 'tis too late, what Inconveniencies these ill Habits in Time may lead you to: Consider, I exhort you, the Anxiety, the Trouble, which you give your sincerest Friends by your Perseverance in your evil Ways. Reflect with yourself, and do as you would be done by. Is your Conduct at present such as you would countenance and allow, were you a Master yourself? Are you so capable of pursuing your Business, and promoting



ting your Interest the next Morning, with that Life and  
 your, as if you went to Bed sober, and in due Time?  
 not, are not your mis-spent Evenings a double Disad-  
 vantage to your Master? Will not your taking what you  
 small Liberties at present, lead you on, in Process of  
 me, to take much greater? 'Tis not, let me tell you, in  
 any one's Power to stop when he pleases; and who  
 knows, but at last you will arrive at such a Pitch of Ob-  
 edience, as to be subject to no Manner of Restraint?

For my own Part, I think I may presume to say, I serv-  
 ed seven Years myself, not only with Pleasure, but with Re-  
 lation. I thought likewise, though my Apprenticeship  
 was not expired till I was two and twenty, that I was my  
 Master full soon enough. What your Thoughts may  
 be on the like Occasion, I can't say; but I wish you may  
 rather consult your own Interest and Credit, as I have  
 done mine before you. Give me leave to tell you freely,  
 that I should never have thought it either reputable or  
 just, to take such Liberties as you do.

You are now at an Age, when, instead of indulging  
 yourself in your Pleasures, you should study to cultivate  
 and improve your Mind. By applying to proper Books,  
 you will qualify yourself for the best of Company; very  
 much contract your daily Expences; fill up your vacant  
 hours, avoid a World of Temptations; and, in a Word,  
 you will look down with an Eye of Pity on those frothy  
 companions, with whom you seem now to associate with  
 much Eagerness and Delight.

As nothing but my sincere Regard for your future Hap-  
 piness and Welfare could induce me to expostulate with  
 you on this Breach of your Conduct, I hope that my  
 friendly Admonitions will have the desired Effect, and that  
 your speedy Amendment, I shall have no Cause to re-  
 pent of taking on me the important Trust which your Fa-  
 ther has reposed in me. Should your Master, as I hope he  
 will, send me Word of the Success of these Remonstrances,  
 I shall want for no Encouragement from, *Cousin,*

*Your affectionate Guardian,*

L. S.

LETTER



## General Instructions for

## LETTER VII.

*From a Tradesman in London, to his Country Correspondent, begging the Favour of a speedy Adjustment of Accounts between them.*

S I R,  
**A**N unforeseen Accident has happened, that obliges me to beg of you to settle the Account that stands between us. We have had Dealings together long enough I hope, to be free with one another on any emergent Occasion: I would not have made my Application indeed had I a Friend in Town on whose Assistance I could safely depend. If it will be any Prejudice, however, the least to your Affairs to discharge the Whole, the Remittance of forty Pounds, or such other Part only, as you shall think proper, will be of singular service at this critical Conjunction, and lay a particular Obligation on,

Sir, Your most humble Servant, &c.

## LETTER VIII.

*The Correspondent's Answer.*

S I R,  
**I**AM very sensible some Exigence more than ordinary must have occasioned the Demand you made; and am therefore sincerely glad, that it lies in my power to answer your Expectations without any farther Application. Our Carrier sets out next *Wednesday*, and I shall order him to deliver you a Bank Note for Four score Pounds. As for the Residue, it shall be returned you within a Fortnight farthest; at which Time I propose to give you a fresh Order, and commence a new Debt. I shall let you know what Credit I expect, and take care to make you punctual Payment. I am, Sir,

Your sincere Friend and humble Servant.

## LETTER IX.

*From a Servant to his Master in the Country.*

S I R,

**A**S I perceive your Affairs are likely to detain you longer Abroad than you promised when you were

at Home, I thought myself obliged in Point of Duty to inform you, that all your good Family are in perfect Health; and that, as to the Business of the Shop, you may assure yourself, each Branch of it shall be carried on with as much Care and Fidelity, as if you were here in Person. Every Body longs for your Return, as soon as your Affairs will any ways permit: My good Mistress in particular, begins to be impatient. In the mean Time, however, you may depend on having immediate Notice, if any thing material occurs, from,

Sir, Your faithful Servant,

P. E.

## LETTER X.

*To a Correspondent.*

S I R,

Have received yours of the fifth of *February* last, with your Invoice and Bill of Lading inclosed. I shall re-  
ceive you by the next Post 100*l.* Bank Note, and beg the favour of you to send me by *Aaron Hill*, our Carrier, the next Opportunity, ten Pieces of Superfine Black Cloth, at about 15*s.* per Yard, and thirty Pieces of Scotch Holland, at about 3*s.* or 3*s.* 6*d.* per Yard, as your Judgment shall direct you. I am, Sir, Your humble Servant,

P. G.

## LETTER XI.

*The Correspondent's Answer.*

S I R,

YOURS, of the 20th of this Instant *March*, lies now before me; as also another of the 30th, with a Bill of 150*l.* which is paid, and placed to Account, I have this Day, according to your Order, sent the Black Cloth and Holland, and doubt not but they will please you at the Price in the Bill inclosed. I am, Sir, &c.

## LETTER XII.

*a young Tradesman, too apt to be in a Hurry in the Prosecution of his Business.*

Cousin John,

THE great Regard I have always had for you, not only on your own Account, but for the dear Remembrance likewise of your good Father and Mother,

H

both

both lately deceased, to whom I was greatly indebted for their many Favours, is the only Motive that induces me to trouble you with the following cursory Hints, which flatter myself, you will receive with the same Candour and good Humour as I intend them.

I have called, Cousin, upon you, Time after Time, and have always found you, 'tis true, where you ought to be in your Shop; but then I perceived you were always in such a Flutter and Confusion, that I could never have an Opportunity to talk with you freely, as I proposed, when I paid my Visits.

It must be acknowledged, than on some particular Occasions, a more than ordinary Hurry and Fatigue in Business cannot possibly be avoided; but that can never be always the Case, in my Opinion, with the most extensive Dealer. The great Art of Trade lies, Cousin, as I take it, in the judicious Disposal of a Man's Time, be his Occupation or Calling what it will.

Most young Traders, indeed, are fond of appearing mighty busy, imagining they shall be observed, and applauded for their Industry and Application; but, in my humble Opinion, those Flutters are rather the Effect of Indolence, and a too great Neglect of their Business at proper Seasons; and, as a Confirmation of what I have asserted, I shall only lay before you the daily Practice of an unfortunate Shopkeeper of my intimate Acquaintance, who was remarkable for driving his Business on with the utmost Precipitation.

My Friend, 'tis true, some few Years, carried on a very advantageous Business; but then, at last, under the Pretence of promoting Trade, indulged himself every Evening, in meeting with a Set of Bottle-Companions at the Tavern; and very seldom, if ever, neglected those social Engagements.

In order therefore to be punctual there, and make personal Appearance as soon as possible, the Business of the Day was all Hurry and Confusion. Though he did not keep excessive late Hours, yet he was no Starter, and seldom got home till Eleven or Twelve. The Night was spent, and the Bottles all empty, the Morning, which is the most precious Part of the Day, was spent in Indolence and Ease. If the most valuable Customer he had came

his Shop before Nine, the Maid durst not disturb him. His Apprentice, indeed, would beg the Favour of them to call again; and when his usual Hour of Rising came, so many different Matters wanted to be discharged, that he was in one continued Ferment till about Two, at which time he went to Dinner. Little after that was done; for he indulged himself in an elegant Way of Eating, as well as Drinking; off he went to the Tavern, and this Course he pursued for some considerable Time.

Thus, though he never applied himself regularly to Business above four Hours in the Day, he would be constantly complaining of Business lying too heavy on his Hands; that 'twas with the utmost Torment he went thro' it; and his Life, in short, seem'd to those who observed him only whilst behind the Counter, one continued Scene of Industry and Fatigue.

Now, Cousin, had he made it his Custom to rise at Six, and get himself dress'd, and ready for his Shop by Seven, all his Business would have every Day been reduced within a narrow Compass by Twelve. In the first two Hours he would have met with but little, if any, Interruption; and by such a Practice he might have improved his Servants by his own good Example; have given them the necessary Directions for the whole Day; and had Time sufficient besides, not only to have inspected his Books, but to have written to all his Correspondents; and by that means have disposed all Things in such an Order, that whatever Business occurred afterwards, whether more or less, might have served him only for an Amusement.

But not to dwell too long on my Story, what was the result, think you, of my Friend's great Hurry and Precipitation? Why, he met with some Losses and Disappointments in Trade, (as who does not?) and his Customers not seeing him in the Shop in the Morning, and always in Flutter when he was there, his Business insensibly dwindled away; his Creditors began to suspect him; and he had the Mortification, on the Adjustment of his Accounts, that had too long lain by neglected, to find the Balance of 1000 l. to his Disadvantage, to quit a Business he had managed with so much Imprudence, and to live upon a Charity which his Friends procured for him, and afforded bare Subsistence only for himself. I leave you to judge

of the Misfortunes that must by Consequence attend a poor Wife and Children, who built their Dependence on him.

This Instance, I hope, Cousin, will afford you a Lesson of Instruction; and, as I have a good Opinion of your Prudence, I doubt not but you'll endeavour to correct the Fault which I have too often observed, and taken at the Time the Liberty to reprove.

I could not forbear giving you this Caution, lest you should postpone that to another Day, which might be ought to be done in this; and by such a Delay be unable to keep your Business within due Bounds. Method, Cousin, next to Industry and Application, is every Thing in any Occupation whatsoever. By falling into a regular Way, you will always be calm, free, and easy; and have Time sufficient to amuse your Female Customers, who for the most part pretty tedious in making their Bargains and will be humour'd as well as courted to a Compliance. And how, think you, must any Man be capable of being having thus, as 'tis his Interest always to do, in case he prefers his Bottle to his Shop, and indulges himself in his Bed, when he should be in his Business: As you are very sensible, I have no other Ends in View than your future Welfare and Success in the World, I am well assured you'll take these cursory Admonitions in good Part, from Sir,

*Your sincere Friend and affectionate Cousin,* M.

**H**AVING thus given our Readers a transient Idea of the Style or Manner in which they ought to dictate their Letters of Mirth and Gaiety, as well as those of Trade and Commerce; and having added thereto some few Copies for their Practice and Imitation, we flatter ourselves, as young Persons are too liable to Mistakes for want of proper Information, in regard to such as are either in Office, or of elevated Birth and Fortune, that it will be deem'd a proper, as well as natural Conclusion of this our present Undertaking, to instruct them how to direct to, and pay their Addresses in due Form, and with propriety, to their Superiors, however dignified and distinguished either in Church or State.

TER



## TERMS of ADDRESS.

*To the Royal Family.*

To the King's most excellent Majesty. *Sire, or May it please your Majesty.*

To his Royal Highness George Prince of Wales. *May it please your Royal Highness.*

*V. B.* The like to all the rest of the Royal Family, Male or Female, *mutatis mutandis*, that is, changing what is necessary to be changed.

*To the Nobility.*

To his Grace the Duke of *S.* *My Lord Duke; your Grace.*

To the most noble Peter, Marquis of *S.* *My Lord Marquis; your Lordship.*

To the Right Hon. John, Earl of *S.* *My Lord; your Lordship.*

To the Right Hon. J. Lord Viscount *M.* *The same.*

To the Right Hon. P. Lord O. *The same.*

*B.* Here observe, that Noblemen's Wives are address'd equal to their Husbands Dignity.

That all the Sons of Dukes and Marquisses, and the best Sons of Earls, have the Titles of Lord and Right Honourable, by the Courtesy of England.

To the Sons of Viscounts and Barons are given the Titles Esquires and Honourable; and that of Honourable likewise to their Daughters, but without any other Addition.

Every Gentlemen, in any Place of Honour or Trust, is styled Honourable; but no Commoners (those of his Majesty's Council, the Lord Mayors of London, York, and Dublin, and the Lord Provost of Edinburg, for the Time excepted) are styled Right Honourable.

Lastly, every considerable Servant to his Majesty, the Prince of Wales, or any other of the Royal Family, is, if on the Civil or Military List, distinguished by the Title of Esquire.

*To the Parliament.*

To the Right Hon. the Lords Spiritual and Temporal, Parliament of Great Britain, assembled. *My Lord; if please your Lordship.*

To the Hon. the Knights, Citizens, and Burgesses, in Parliament of Great Britain, assembled. *Gentlemen; May please your Honours.*

To the Right Honourable Sir H. B. Speaker of the House of Commons. *Honourable*

Honourable House of Commons. *Sir*; or if he be a Lord *My Lord*; or *May it please your Lordship*.

N. B. He is generally a Member of the Privy Council.

*To the Clergy*

To the most Reverend Father in God *A.* Lord Archbishop of *C.* or *Y.* *My Lord, your Grace.*

To the Right Reverend Father in God, *O.* Lord Bishop of *L.* *Right Reverend Sir.*

To the Rev. Mr. or Dr. according to their Station *A.* Z. Dean of *B.* Chancellor of *C.* Archdeacon of *D.* Prebendary of *E.* Rector of *F.* Vicar of *G.* Curate of *H.*

The general Term to these is, *Sir*; but to a *Dean* or *Archdeacon* we say, *Mr. Dean*, and *Mr. Archdeacon*.

All Rectors, Vicars, Curates, and Clergymen of other Inferior Denominations, are styled *Reverend*.

*To the Officers of his Majesty's Household.*

To these we address for the most Part according to their Quality, but sometimes according to their Office; as, *My Lord Steward, My Lord Chamberlain, &c.*

*To the Commissioners, &c. on the Civil List.*

To the Right Hon. *A.* Earl of *B.* Lord Privy Seal—Lord President of the Council—Lord Great Chamberlain—Earl Marshal of *England*—One of his Majesty's Principal Secretaries of State, &c. *My Lord*; or *May it please your Lordship*.

To the Right Hon. the Lords Commissioners of the Treasury—of the Admiralty, &c. *The same.*

To the Hon. the Commissioners of his Majesty's Customs—Revenue of Excise, &c. *May it please your Honour*.

*To the Soldiery.*

To the Right Hon. *A.* Earl of *B.* Capt. of his Majesty's First Troop of Horse Guards—Band of Gentlemen Pensioners, &c. To *A. B.* Esq; Lieutenant General—Surveyor General of the Ordnance, &c. *Your Honour*.

*To the Officers of the Navy.*

To his Grace *A.* Duke of *B.* Lord High Admiral of Great Britain. *Your Grace.*

To Vice-Admirals, Rear-Admirals, and Captains, &c. *or, Your Honour*; except they be Noblemen.

*To the Ambassadors.*

To his Excellency, Sir *A. B.* Bart. Envoy Extraordinary from his *Britannic* Majesty to—Ambassador to his Resident at, &c. *Your Excellency.*

To Secretaries and Consuls. *Sir.*

*To the Judges and Lawyers.*

To the Right Hon. A. Baron of B. Lord High Chancellor, — Master of the Rolls — Lord Chief Justice of the King's Bench, and Common Pleas. *My Lord; your Lordship;* and to such as are only *Honourable,* — *Sir; may it please you, Sir:* And the same to all other Graduates in the Law.

N. B. Every Barrister is styled *Esquire.*

Note, All such Gentlemen as are in the Commission of Peace, are also styled *Esquires,* and address'd to as *Worshipful;* as are also Sheriffs and Recorders.

The Aldermen and Recorder of the City of London, and all Mayors of Corporations, (the Lord Mayor only excepted) have the Title of *Right Worshipful.*

Governors of Hospitals, Colleges, &c. are styled *Right Worshipful,* or only *Worshipful,* according as their respective Titles may be.

Bodies Corporate are styled *Honourable,* and sometimes *Worshipful.*

A *Baronet* and a *Knight* are for the most Part styled *Honourable,* and their Wives have the Title of *Ladies.*

As to the Address made to *Merchants,* and other Persons in Trade, it is only, *Sir.*

# PRACTICAL ARITHMETIC.

## SECTION I.

OF NUMERATION, ADDITION of Whole Numbers, Money, Weights, and Measures, &c.

**N**UMERATION is the true Distinction and Pronunciation of Number; that is, it teaches us to write down, read, and express any Number or Numbers whatsoever: For the better understanding of which, observe the following Table.

N. B.

N. B. The Letter C stands for an Hundred; and for Ten.

## T A B L E.

| Places | C of Millions.<br>X of Millions.<br>Millions. |   |   | C of Thousands.<br>X of Thousands.<br>Thousands. |   |   | Hundreds.<br>Tens.<br>Units. |   |   |
|--------|-----------------------------------------------|---|---|--------------------------------------------------|---|---|------------------------------|---|---|
|        | 9                                             | 8 | 7 | 6                                                | 5 | 4 | 3                            | 2 | 1 |
|        |                                               | 9 | 8 | 7                                                | 6 | 5 | 4                            | 3 | 2 |
|        |                                               |   | 9 | 8                                                | 7 | 6 | 5                            | 4 | 3 |
|        |                                               |   |   | 9                                                | 8 | 7 | 6                            | 5 | 4 |
|        |                                               |   |   |                                                  | 9 | 8 | 7                            | 6 | 5 |
|        |                                               |   |   |                                                  |   | 9 | 8                            | 7 | 6 |
|        |                                               |   |   |                                                  |   |   | 9                            | 8 | 7 |
|        |                                               |   |   |                                                  |   |   |                              | 9 | 8 |
|        |                                               |   |   |                                                  |   |   |                              |   | 9 |

## NOTE I.

This T A B L E ought to get by Heart at least, so as to understand the Nature of it.——Cast your Eye now and you see there are nine Places of Figures from Units

to Hundreds of Millions. All the Figures under the first Row are Units; those in the second Row towards the Left-Hand, are under the Place of Tens; all the third Row are called Hundreds; those in the fourth Row Thousands, &c.

Now, in Order to know the Value of, or how to express any Number in the Table, I begin at the top Figure, towards the Right-Hand, and say Units; (1) the Units, Tens, (Twenty-one, 21;) then Units, Tens, Hundreds, (three Hundred and Twenty-one, 321;) Thus I go on, and find the fourth Figure (viz. 4) under the Place or Name of Thousands, and accordingly, I call it four Thousand, which, joined to the other three Figures, will be four Thousand, three Hundred, and Twenty-one, 4,321. The Fifth Figure being in the Place of Tens of Thousands, is thus read: Fifty-four Thousand, three Hundred, and Twenty-one, 54,321. Thus proceed till you come to the last Figure of all, towards the Left-Hand, (which stands in the Place of Hundreds of Millions) and you will easily perceive, that those nine Figures are thus expressed: Nine Hundred, eighty

several

even Millions, six Hundred, fifty-four Thousand, three Hundred, and Twenty-one, 987,654,3,21. Read this once more, and observe the Comma's, or Stops, that are put to the Figures; for they answer to, or correspond with, the Stops in the Words that are written at Length.

**N O T E 2.**

Observe further that the Numeration-Table is not always set with these Figures just in the Form they here stand; for had they been any other nine Figures, they are numbered and expressed after the same Manner: For Instance, suppose they were 1,2,3,4,5,6,7,8,9, this is expressed after the same Manner, only instead of 987 Million, is now 123 Million; instead of 654 Thousand, it is here 56 Thousand; and instead of 321, it is now 789. So also, 999,999,999 is read thus: Nine hundred, ninety-million, nine hundred, ninety-nine Thousand, nine Hundred, and Ninety-nine, &c. So that you see it is only having a due Regard to the Places under which the Figures stand; for after the first three Places of Figures (viz. Units, Tens, and Hundreds) the next three Places have the Name of Thousands, the next three the Name of Millions, as the following Table.

**T A B L E 2.**

| Millions Place. | Thousands Place. | Hundreds. | Tens. | Units. |
|-----------------|------------------|-----------|-------|--------|
| 1 2 3.          | 4 5 6.           | 7 8 9     |       |        |
| 1 2.            | 3 4 5.           | 6 7 8     |       |        |
| 1.              | 2 3 4.           | 5 6 7     |       |        |
|                 | 1 2 3.           | 4 5 6     |       |        |
|                 | 1 2.             | 3 4 5     |       |        |
|                 | 1.               | 2 3 4     |       |        |
|                 |                  | 1 2 3     |       |        |
|                 |                  | 1 2       |       |        |
|                 |                  | 1         |       |        |

Here they are divided by Stops, or Periods, which may help towards expressing the Numbers: Thus, Suppose I would



would express the Number against which this Mark (\*) is placed. I find the Twelve stands under the Place of Thousands, so that I say it is twelve Thousand, three Hundred and Forty-five, &c.

Cyphers are of no Signification, when they stand alone (thus 000, or 0000, all stand for Nothing: Nor are they of any Signification placed before any Figure or Figures thus, 02 is but 2; and 0005 is but 5 still: But when Cyphers are put after Figures, it makes the Number ten, twenty, thirty, a hundred, or a thousand Times more in Value. Thus 1, by adding a Cypher, is (10) Ten, add two Cyphers thus, 100, it is an Hundred, &c. as by the following Table.

T A B L E 3.

|               |                              |
|---------------|------------------------------|
| 1             | One.                         |
| 10            | Ten.                         |
| 100           | An Hundred.                  |
| 1000          | A Thousand.                  |
| 10000         | Ten Thousand.                |
| 100000        | An hundred Thousand.         |
| 1000000       | A Million.                   |
| 10000000      | Ten Million.                 |
| 100000000     | An hundred Million.          |
| 1000000000    | A thousand Million.          |
| 10000000000   | Ten thousand Million.        |
| 100000000000  | An hundred thousand Million. |
| 1000000000000 | Millions of Millions.        |

And thus you may go on as far as you please:

For suppose I had ever so many Figures to number; yet, by the last Table, that the seventh Figure is Millions Place; and that the thirteenth Place has the Name Millions of Millions; so also the nineteenth Figure would be Millions of Millions of Millions: But as the Words Millions would be repeated so often in a very large Number of Figures, as to render it tiresome, there is a shorter and much easier Way of expressing the Number by certain Words, which answer to every seventh Figure, and any Degree of Millions, as appears by the following Table.

T A B L

### TABLE 4.

|      |     |                                                |
|------|-----|------------------------------------------------|
| ots. | The | 7th Figure from the Units Place is Millions.   |
| 1    | 13  | is Bimillions, or Millions of Millions.        |
| 2    | 19  | is Trimillions, or the 3d Deg. of Millions.    |
| 3    | 25  | is Quartrillions, or the 4th Deg. of Millions. |
| 4    | 31  | is Quintillions, or the 5th Deg. of Millions.  |
| 5    | 37  | is Sexquillions, or the 6th Deg. of Millions.  |
| 6    | 43  | is Septillions, or the 7th Deg. of Millions.   |
| 7    | 49  | is Octillions, or the 8th Deg. of Millions.    |
| 8    | 55  | is Nonmillions, or the 9th Deg. of Millions.   |
| 9    |     | or Millions 9 Times repeated, &c.              |

Suppose it were required to number the 57 following figures, 321, 987, 654, 321, 987, 654, 321, 987, 654, 321, 987, 654, 321, 987, 654, 321, 987, 654, 321.

Here I make a Period or Dot over every 7th Figure, and there are 9 Dots in all: Then searching in the above Table, I find the 9th Dot to bear the Name of Nonmillions, the 8th of Octillions, &c. Therefore, I number the above Figures thus; 321 Nonmillions, 987 Thousand; 654 Octillions, 321 Thousand; 987 Septillions, 654 Thousand; 321 Sexquillions, 987 Thousand; 654 Quintillions, 321 Thousand; 987 Quartrillions, 654 Thousand; 321 Trillions, 987 Thousand; 654 Bimillions, 321 Thousand; 987 Million, 654 Thousand, 321. And thus you may go on to many more Places, &c. Or you may number them by the second Part of the Table, and that is, by putting small Figures where the Dots stand, as 1, 2, 3, 4, till you come to 9; Then begin, and say 321<sup>9</sup> of the 9th Degree of Millions, 987 Thousand; 654<sup>8</sup> of the 8th Degree of Millions, &c. till you come to the End; And thus, by putting small Figures over every 7th Figure, you may number the 20th, 30th, or any higher Degree of Millions whatsoever.

A common Question in Arithmetic is to set-down eleven thousand, eleven Hundred, and Eleven, in 5 Figures? The Answer is 12,111, viz. twelve Thousand, one hundred, and Eleven.

### Proof

Proof by A D D I T I O N.

|                    |        |   |
|--------------------|--------|---|
| Eleven Thousand is | 11,000 | } |
| Eleven Hundred is  | 1,100  |   |
| Eleven is          | 11     |   |

12,111, as above.

Another is, how to set down fifteen Thousand, fifteen Hundred and Fifteen, in five Figures. The Answer is 16,515.

But these Oddities are badly expressed, and are an Abuse of Language: For, suppose you stood indebted to me, and should ask me, what it was, and I should say fifteen fifteen Pounds, fifteen Shillings, and fifteen Pence; would you not think it much better to say fifteen Pounds, sixteen Shillings, and three Pence? But the best Method of Expression is the shortest, freest, and most natural. Therefore, tho' the aforesaid Numbers run a little smooth in Words, (because they are each but one whole Number) yet is the Sense of expressing fifteen Thousand, fifteen Hundred, and fifteen, very little better than fifteen Pounds fifteen Shillings, and fifteen Pence.

Yet there are some Things a little dark in Expression which are of Use when known; as we read in the Book of Kings, and in Isaiah, that an Angel destroyed, in the Camp of the Assyrians, an Hundred, and Fourscore, and five Thousand.

Now consider that Fourscore and five is the same as 85, and the Number is 185,000, one Hundred, eighty five Thousand.

Again, you read in the Revelations, of a Multitude of ten Thousand Times ten Thousand; which is 100,000,000, viz. one Hundred Million: And a little further, you read of another, consisting of two Hundred Thousand Thousand, which is, 200,000,000, viz. two hundred Million, which you will see demonstrated, Example the 3d and 4th in Compendiums of Multiplication.

We shall finish Numeration with some of the old Roman Numbers, as it may be of Service.

A T A B L E

**A TABLE of Old ROMAN NUMBERS.**

stands for (50) Fifty.  
 for (100) Hundred.  
 C. for (200) Two Hundred.  
 CC. for (300) Three Hundred.  
 CCC. for (400) Four Hundred  
 for (500) Five Hundred, or thus *I*̄.  
 C. for (600) Six Hundred, or thus *I*̄C.  
 CC. for (700) Seven Hundred, or thus *I*̄CC.  
 CCC. for (800) Eight Hundred, or thus *I*̄CCC.  
 CCCC. for (900) or thus *I*̄CCCC.  
 for (1000) A Thousand, or thus *C*̄.  
 M. for (2000) Two Thousand, &c.

**ROMAN NUMBERS explained by FIGURES.**

DL. 550.  
 DCCX. 710.  
 MDXIV. 1514.  
 MDCLI. 1651.  
 MDCCIX. 1709.  
 MDCCLIX. 1759.  
 MDCCLXIV. 1764.

**SECTION II.**

**OF ADDITION.**

**A**DDITION is the gathering, and adding together two, or more, Numbers into one Sum. Addition is simple and compound. Simple Addition consists of one simple or single Name; that is to say, of whole Numbers only, as Pounds Sterling, Tons, Yards, &c. For Ten is Ten, and a Thousand a Thousand, in any Number or Quantity, though the Quality or Name be different; and they are all added by the Rule, namely, by casting out the Tens, and setting down in every Line what is over Ten. Compound Addition is of Money, Weights, and Measures, viz. Avoirdupois Weight, Troy Weight, Apothecaries

carries Weight, and Goldsmith's Weight, &c. Likewise Dry Measure, Liquid Measure, Cloth Measure; Square Measure, Long Measure, Land Measure, and Time. Of these in Order.



### SECTION III.

#### ADDITION of whole Numbers.

**T**HE Rule to be got by Heart is,  
For every Ten in the Units Place, or first Row of Figures, you must carry one to the Tens Place, or second Row, and so proceed; because Ten Units make Ten, Ten Tens an Hundred, and Ten Hundreds a Thousand.

#### THE EXPLANATION.

First, If there is but one Row of Figures, you must set down under the Row what it comes to, and if it amounts to 2, or more Figures, set the first under the Row, or Sum; and the other Figure, or Figures, set to the left Hand of the first Figure as for Example.

|        |        |         |                 |
|--------|--------|---------|-----------------|
| Add 2  | 3      | 2       | 9               |
| 1      | 2      | 1       | 7               |
| 1      | 1      | 4       | 8               |
| 5      | 2      | 3       | and 4 together. |
| <hr/>  | <hr/>  | <hr/>   | <hr/>           |
| 9 Anf. | 8 Anf. | 10 Anf. | 28 Anf.         |

Here I say 5 and 1 is 6, and 1 is 7 and 2 is 9; which I place under the Numbers, and it is done: But to prove whether it be right, I begin at the Top, and cast it downwards, and find it comes to the same.

Secondly, If it amounts to just Ten and no more (as in Example 3) set it down as before; only set the Cypher under the Row, and set the Figure of 1 out towards the Left-Hand. So also, in Example 4, I find it amounts to 28, which I set under the Row, viz. the Units 8 under the Row itself, and the 2 towards the Left-hand in the Place of Tens.

Thirdly,



Thirdly, When you have two or three Rows of Figures, then, according to the Rule, add up the first Row, or Units Places, and observe how many Tens it contains, and if it comes just to even Tens, set a Cypher underneath, and carry as many Ones to the next Row as there were Tens in it; that, is, if it be 20, carry 2, if it be 30, carry 3, if 40, carry 4, and for 50, carry 5, &c. And the last Row of all set down what it amounts to, as if it were one single Row only.

**An EXAMPLE at large.**

Add 87625 Pound  
 94915  
 62194  
 76547  
 81965  
 92198  
 and 71964 together.  


---

 567408 Ans.

Now observe once for all. I begin, and say, 4 and 9 is 13, and 5 is 18, and 7 is 25, and 4 is 29, and 5 is 34, and 5 is 39; this is the Amount of the first Row, Units Place, but I must not set down the whole 39, I see how many Tens it contains, and find it to be 3 Tens, and 9 over; this 9 I set under the Row, and carry 3 to the next Row, or Tens Place, saying, 3 that I carry and 6 is 9, and 9 is 18, and 6 is 24, and 4 is 28, and 5 is 33, and 1 is 34, and 2 is 36: This being just 3 Tens, I set down a Cypher, and carry 3 for the 3 Tens to the next Row, or Hundreds Place, saying, 3 that I carry and 9 is 12, &c. and I find the third Row to be 44, which is 4 Tens and 4 over; therefore, I set down 4, and carry 4 to the fourth Row, or Place of Thousands, and find it amounts to 27, then I set down the odd 7, and carry 2 to the Fifth, or last Row, and find that it amounts to 56, and because this is the last Row I set down the whole 56, that is, the 6 under the Row, and the 5 to the Left-hand.

Fourthly, When there are several Numbers to be added together, consisting some of fewer and some of more Figures,

Figures, they are added after the same Manner as before, only observe, in setting down the Numbers on your Slate, or in a Book, that you be careful to set Units under Units, Tens under Tens, or else you will be puzzled in casting them up.

Ex. 6. Suppose I were to add 3417, 26, 184, 9, 271 and 3 together: I set them down as follows, which will be a standing Rule for any Thing of the like Nature.

## EXAMPLE 6.

Loads.

3417

26

184

9

271

3

---

3910

Here I set Units under Units, and Tens under Tens and then cast up from Row to Row as before directed.

It might be set down with Cyphers, to supply the vacant Places: Thus

3417

0026

0184

0009

0271

0003

---

3910

But this is superfluous; Cyphers before Figures do not at all increase the Value: Besides, it is neither so fight nor advantageous to cast up, and are seldom or ever used by Accomptants, even in Addition of Money, to supply up any Line or Space whatsoever, as you will see in Example 13 of Addition of Money.

More Examples in Whole Numbers.

| Bushels. | Ells  | Yards. |
|----------|-------|--------|
| 471756   | 6715  | 65432  |
| 434176   | 46    | 2145   |
| 621985   | 9     | 234    |
| 942176   | 2176  | 67     |
| 354219   | 200   | 8      |
| 471625   | 6     | 76     |
| 982196   | 10    | 354    |
| 853294   | 1756  | 3256   |
| <hr/>    | <hr/> | <hr/>  |
| 513147   | 1     | 76258  |
|          | 10919 | 147830 |

QUESTIONS to exercise ADDITION of whole Numbers.

Quest. 1. From London to Rumford is 11 Miles, from Rumford to Brentwood 6, from Brentwood to Chelmsford 11, from Chelmsford to Witham 8, from Witham to Kelvedon 4, from Kelvedon to Colchester 10, from Colchester to Manningtree 9, and from Manningtree to Harwich 12 : How many Miles then is it from London to Harwich ?

To answer this, set down the Numbers, and cast them up, thus

|                           | Miles.  |
|---------------------------|---------|
| From London to Rumford    | 11      |
| Rumford to Brentwood      | 6       |
| Brentwood to Chelmsford   | 11      |
| Chelmsford to Witham      | 8       |
| Witham to Kelvedon        | 4       |
| Kelvedon to Colchester    | 10      |
| Colchester to Manningtree | 9       |
| Manningtree to Harwich    | 12      |
| <hr/>                     | <hr/>   |
| From London to Harwich    | 71 Anf. |

Quest 2. A Farmer has seven Fields, containing the following Acres, viz.

|                  | Acres. |                                           |
|------------------|--------|-------------------------------------------|
| In one Field are | 25     | } How many Acres are there all? Ans. 192. |
| In another       | 57     |                                           |
| In another       | 18     |                                           |
| In another       | 25     |                                           |
| In another       | 15     |                                           |
| In another       | 43     |                                           |
| In another       | 9      |                                           |

Ans. 192 Acres.

Quest. 3. A Draper has six Pieces of Cloth, as under.

|                                 | Yards. |                                              |
|---------------------------------|--------|----------------------------------------------|
| * N <sup>o</sup> . 1 containing | 87     | } How many Yards are there in all? Ans. 210. |
| 2                               | 45     |                                              |
| 3                               | 17     |                                              |
| 4                               | 8      |                                              |
| 5                               | 32     |                                              |
| 6                               | 21     |                                              |

Ans. 210

Quest. 4. How many Days are there in the Year, or the twelve Calendar Months? First set them down as follows :

|                    | Days. |                                                                                               |
|--------------------|-------|-----------------------------------------------------------------------------------------------|
| First, January has | 31    | } Note, Every fourth Year is called Leap Year and has 366 Days; February having then 29 Days. |
| February           | 28    |                                                                                               |
| March              | 31    |                                                                                               |
| April              | 30    |                                                                                               |
| May                | 31    |                                                                                               |
| June               | 30    |                                                                                               |
| July               | 31    |                                                                                               |
| August.            | 31    |                                                                                               |
| September          | 30    |                                                                                               |
| October            | 31    |                                                                                               |
| November           | 30    |                                                                                               |
| December           | 31    |                                                                                               |

365

\* Note, That in marking any Sorts of Goods, N<sup>o</sup>. stands for Number.

Quest. 5. How far is it from London to Carlisle in  
 umberland, when,

|                             | Miles. |
|-----------------------------|--------|
| From London to Newcastle is | 149    |
| From Newcastle to Preston   | 62     |
| From Preston to Lancaster   | 21     |
| From Lancaster to Penrith   | 50     |
| From Penrith to Carlisle    | 19     |

Ans. 301 Miles.

Quest. 6. Add 47, 697, 5, 91707, 100000, 26300175,  
 00, 62, and 987654321 together. Ans. 1014147514.

**To prove A D D I T I O N.**

Addition is proved two Ways. First, When you have  
 cast up any Sum, as before directed, then begin at the  
 Top, and cast downwards instead of upwards; and if the  
 figures come the same, no Doubt but the Work is right:  
 indeed, in Things which require Care, you should make  
 Practice of casting every Line, first upwards, and then  
 downwards.

The second Way is too tedious for Business; but as it is  
 customary in Schools to teach it, I shall shew you the  
 Method:

Let us take Quest. 5, which amounts to 301 Miles.  
 To prove whether this be right, I cut off the Top Line  
 of Figures with my Pen, thus—

149  


---

 62  
 21  
 50  
 19

301 Ans.

152 Add this to the Top 149.

301 Proof. See Addition of Money.

Then



Then I begin to cast up the Sum again, only instead of going to the Top of all, I now, cast no further than the 2, (leaving out all the Figures that are cut off, or that stand above the Line) and find it amounts to 12, which I place under the 2, and I carry 1; then I proceed to the second Row, and find it amounts to 15; so that this amounts in all to 152, which I place under the 301. Lastly, I add the middle Line 152 to the top Line 149, and find that they make just 301, which proves the first Work to be right. We now proceed to

S E C T I O N IV.

ADDITION of MONEY.

**L**ET the following 1. Rule; 2. Characters; 3. Pence Tables, be got perfectly by Heart in the first Place.

1. The RULE.

For every 4 Farthings carry 1 Penny to the Pence; every 12 Pence carry 1 Shilling to the Shillings; and every 20 in the Shillings carry 1 to the Pounds, which cast up by Tens, as in whole Numbers.

2. Of the common CHARACTERS.

Note 1. £. stands for Pounds, S. stands for Shilling, D. stands for Pence. Or thus, £. s. d. Pounds, Shilling, Pence.

Note 2. A Farthing is one fourth Part of a Penny, and is thus set down  $\frac{1}{4}$ . An Halfpenny is one Half, and thus set down  $\frac{1}{2}$ . Three Farthings, being three Fourths are thus set down  $\frac{3}{4}$ .

Note 3. 1 Quarter, 1 Half, and 3 Quarters, are set thus,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ .

3. OF PENCE TABLES.

| TABLE 1. |    |    |
|----------|----|----|
| Pence.   | s. | d. |
| 20       | 1  | 8  |
| 30       | 2  | 6  |
| 40       | 3  | 4  |
| 50       | 4  | 2  |
| 60       | 5  | 0  |
| 70       | 5  | 10 |
| 80       | 6  | 8  |
| 90       | 7  | 6  |
| 100      | 8  | 4  |
| 110      | 9  | 2  |
| 120      | 10 | 0  |

| TABLE 2. |    |    |
|----------|----|----|
| Pence.   | s. | d. |
| 12       | 1  |    |
| 24       | 2  |    |
| 36       | 3  |    |
| 48       | 4  |    |
| 60       | 5  |    |
| 72       | 6  |    |
| 84       | 7  |    |
| 96       | 8  |    |
| 108      | 9  |    |
| 120      | 10 |    |

By these two Tables, the first encreasing by Tens, or every 10 Pence; and the other by even Shillings, or every twelve Pence, you may cast up any small Sums, by a due regard to the following Examples.

EXAMPLE 1.

£. s. d.  
 Add 9 - 4 - 2  
 8 - 5 - 3  
 and 7 - 9 - 6 together.  
 24 - 18 - 11

EXAMPLE 2.

£. s. d.  
 Add 41 - 3 - 8  
 62 - 9 - 7  
 and 47 - 11 - 6 together.  
 151 - 4 - 9

EXAMPLE 3.

Add 95 - 16 - 2  
 68 - 14 - 10  
 and 49 - 12 - 11 together.

In the first Example the Pence all added together do not exceed 12; nor the Shillings do not exceed 20; therefore the Amount of them is to be set under the Row to

\* The third Example is left undone for the Practice of the learner.

which

which they belong, and the Total is 24 Pounds, 18 Shillings, and 11 Pence.

In the second Example I say 6 and 7 is 13, and 8 is 21 Pence. Now, by the 1st Table, 20 Pence is 1 s. 8d. therefore, 21 Pence must be 1 s. 9d. Or by the 2d Table I ask how many Times 12 I can have in 21 d. and find 1, and 9 over; therefore, I set the odd 9 down under the Place of Pence, and carry 1 to the Shillings, saying that I carry and 11 is 12, and 9 is 21, and 3 is 24 Shillings. Now, as 20 s. make a Pound, 24 s. is 1 l. 4 s. therefore I set the 4 under the Shillings, and carry one to the first Row of the Pounds, casting them up as in Addition of whole Numbers, and find it 15 l. 1 s. So the Total is 15 l. 4 s. 9 d.

T A B L E 3.

| Shillings. |        | Pounds. | s.   |
|------------|--------|---------|------|
| 20         | } is { | 1       | -    |
| 30         |        | 1       | - 10 |
| 40         |        | 2       | -    |
| 50         |        | 2       | - 10 |
| 60         |        | 3       | -    |
| 70         |        | 3       | - 10 |
| 80         |        | 4       | -    |
| 90         |        | 4       | - 10 |
| 100        |        | 5       | -    |

Add up the following Sums.

## EXAMPLE 4.

| £. | s.  | d.   |
|----|-----|------|
| 45 | - 2 | - 9  |
| 94 | - 5 | - 8  |
| 76 | - 7 | - 10 |
| 51 | - 8 | - 9  |
| 25 | - 7 | - 6  |
| 75 | - 5 | - 11 |

368 - 5 - 5

## EXAMPLE 5.

| £.  | s.  | d.   |
|-----|-----|------|
| 249 | - 3 | - 10 |
| 176 | - 5 | - 8  |
| 649 | - 8 | - 10 |
| 148 | - 7 | - 5  |
| 219 | - 5 | - 7  |
| 154 | - 7 | - 9  |

## EXAMPLE 6.

| £.  | s.  | d.  |
|-----|-----|-----|
| 652 | - 5 | - 8 |
| 652 | - 5 | - 8 |
| 652 | - 5 | - 8 |
| 652 | - 5 | - 8 |
| 652 | - 5 | - 8 |
| 652 | - 5 | - 8 |

In Example 4 you begin at the Row of Pence, and find that it amounts to 53. Now, according to the first Pence

By Table, 50 Pence is 4 s. 2 d. therefore, 53 Pence is 4 s. 5 d. Or by Table 2, I find how many 12 Pences can have in 53 Pence, and find that 4 Shillings is 48 Pence, therefore, 53 d. must be 4 s. 5 d. which odd 5 Pence I set down under the Row of Pence, and carry the 4 Shillings to the Row of Shillings, and find it amounts to 45. Now, by Table 3, I find 45 s. to be 2 l. 5 s. which odd 5 s. I put under the Shillings, and carry 2 l. to the Pounds, which I cast up as in Whole Numbers (by Table 1) and find the Total, or whole Amount, to be 368 l. 5 d.

Examples 5 and 6 are left undone, for Practice after the same Manner. We shall now give two or three Examples in Farthings.

| EXAMPLE 7. |      |                  | EXAMPLE 8. |     |                  | EXAMPLE 9. |     |                  |
|------------|------|------------------|------------|-----|------------------|------------|-----|------------------|
| £.         | s.   | d.               | £.         | s.  | d.               | £.         | s.  | d.               |
| 47         | - 8  | - $4\frac{1}{2}$ | 271        | - 7 | - $6\frac{1}{2}$ | 278        | - 4 | - 3              |
| 15         | - 5  | - 10             | 146        | - 5 | - $8\frac{1}{2}$ | 164        | - 8 | - $9\frac{1}{2}$ |
| 17         | - 4  | - $8\frac{1}{2}$ | 956        | - 8 | - 3              | 215        | - 1 | - 10             |
| 49         | - 9  | - $6\frac{1}{4}$ | 178        | - 7 | - $8\frac{1}{4}$ | 464        | - 5 | - $4\frac{1}{2}$ |
| 15         | - 10 | - 7              | 246        | - 9 | - $7\frac{1}{4}$ | 176        | - 7 | - $8\frac{1}{2}$ |
| 14         | - 7  | - $9\frac{3}{4}$ | 101        | - 6 | - 5              | 291        | - 3 | - 5              |
| 97         | - 3  | - $5\frac{3}{4}$ | 247        | - 8 | - $3\frac{1}{2}$ | 456        | - 7 | - $6\frac{3}{4}$ |
| 14         | - 9  | - 6              | 604        | - 9 | - $8\frac{1}{4}$ | 278        | - 5 | - 7              |
| <hr/>      |      |                  | <hr/>      |     |                  | <hr/>      |     |                  |
| 270        | - 19 | - $9\frac{1}{4}$ |            |     |                  |            |     |                  |

Begin with the Farthings, saying, 3 and 3 is 6, and 1 and 2 is 9, and 2 is 11 Farthings, that is, 2 d. and 1 Farthing over, which 3 Farthings I set under the Row of Farthings (thus  $\frac{3}{4}$ ) and carry 2 Pence to the Pence, and find they amount to 57 Pence, which is 4 s. 9 d. which odd 9 I set under the Pence, and carry 4 to the Shillings, and find them 59, that is, 2 Pounds, and 19 s. which 19 I set under the Shillings, and carry 2 to the Pounds, I find them come to 270: So the Total or Sum is 270 l. 19 s. 2 d.  $\frac{1}{4}$ .

Proceed in the same Manner, and you will find Ex. 8. to be 2752 l. 3 s. 3 d.  $\frac{1}{4}$ .

We shall now give three or four different Ways of making double Figures in the Shillings. Let the Learner choose that which seems easiest to himself.

4. Of

4. Of casting up double Figures in the Shillings, such as 16. 18. 17. or the like.

## EXAMPLE 10.

| £. | s.   | d.                |
|----|------|-------------------|
| 64 | - 17 | - $10\frac{1}{2}$ |
| 47 | - 14 | - 11              |
| 67 | - 18 | - $10\frac{1}{2}$ |
| 55 | - 17 | - $8\frac{1}{2}$  |
| 49 | - 19 | - 11              |
| 64 | - 15 | - 5               |

## EXAMPLE 11

| £.  | s.   | d.                |
|-----|------|-------------------|
| 756 | - 17 | - 8               |
| 175 | - 16 | - $11\frac{1}{2}$ |
| 476 | - 11 | - $9\frac{1}{2}$  |
| 187 | - 17 | - 10              |
| 256 | - 19 | - $5\frac{1}{2}$  |
| 175 | - 14 | - $11\frac{1}{2}$ |

## EXAMPLE 12

| £.   | s.   | d.  |
|------|------|-----|
| 4715 | - 11 | - 1 |
| 1762 | - 14 | - 1 |
| 6417 | - 14 | - 1 |
| 1754 | - 15 | - 1 |
| 6474 | - 19 | - 1 |
| 1762 | - 17 | - 1 |

351 - 04 -  $8\frac{1}{2}$

I cast up the Farthings (first upwards and then downwards) and you will find them 6, I therefore set down  $\frac{1}{2}$ , and carry 1 to the Pence, which are 56, which is 4 s. 8 that is, 8, and I carry 4 to the Shillings; but as there are two Rows of Shillings, or double Figures, I first all cast up that Row, or those Figures that stand towards the Right-hand, saying thus, 4 that I carry and 5 is 9 and 9 is 18, and 7 is 25, and 8 is 33, and 4 is 37, and is 44 the first Row; then I come back upon the second Row, from the Top to the Bottom, calling every Figure of 1, Ten; saying, 44 and 10 is 54, and 10 is 64, (and so on) 74, 84, 94, and 10 is 104 Shillings, which is 4 and 4 Shillings over, that is 4, and I carry 5 to the Pounds, which I find amount to 351. So that the Total is 351 4 s. 8 d.  $\frac{1}{2}$ .

Another Method is to cast up the first Row of Shillings as before, which comes to 44, that is 2 l. 4 s. and the 4 Shillings under the said Row, and carry the 2 l. to the next Row of Shillings, counting 1 l. for every two Figures in the second Row, (because two Tens make 20 s. or 1 l.) Thus in the above Example, there are 10 Figures of 1 in the second Row, and counting two for 1 l. then six will be 3 l. which with the 2 l. that belong to the 44 in the first Row, make 5 l. to be carried to the Pounds as before.

A third Way is, make a Dot at every 4 in the Pence, every 12 in the Pence, every 20 in the Shillings and every 10 in the Pounds. This Method is easy, and



ted to every Capacity. Make your Dots very small. If  
u can see them yourself it is sufficient.

Another Rule for making and casting up long Bills, Parishes,  
&c. is this, For every 60 in the Pence carry 5 to the  
Shillings, because 60 Pence make 5 Shillings: And for every  
in the Shillings carry 3 to the Pounds, because 60  
Shillings make 3 Pound; and lastly, cast the Pounds up  
Tens, as before directed.

The Form of a Parish Rate may be useful, and will  
for any long Bill.

|                        | £.  | s. | d.               |
|------------------------|-----|----|------------------|
| Allen Anthony, Esq;    | 3   | 7  | 8 $\frac{1}{4}$  |
| Andrews John           | 1   | 14 | 7 $\frac{1}{2}$  |
| Baker James, Esq;      | 15  | 16 | 8                |
| Carter Thomas          |     | 17 | 11 $\frac{1}{2}$ |
| Darby Abraham          | 5   | 17 | 5                |
| Fernell Abraham        |     | 19 | 8 $\frac{1}{4}$  |
| Honner Joseph          | 7   |    | 9                |
| Kirton John, Esq;      | 21  | 14 | 7 $\frac{1}{2}$  |
| Longman Thomas         | 5   |    | 11 $\frac{1}{2}$ |
| Lumley Edward          | 3   | 17 | 6                |
| Manning Thomas         |     | 15 | 10 $\frac{1}{4}$ |
| Martin William, Esq;   | 11  | 11 | 8 $\frac{1}{2}$  |
| Martin Job             | 7   | 17 | 8                |
| Nicholls Abraham       | 2   | 13 | 9                |
| Norton Daniel          | 17  | 10 | 4 $\frac{1}{2}$  |
| Parker Esther          |     | 8  | 11               |
| Powel Judith           |     | 5  | 10               |
| Randall Nicholas       | 1   | 17 | 6 $\frac{1}{2}$  |
| Robinson Abraham, Esq; | 15  | 11 | 11 $\frac{1}{2}$ |
| Robinson John          | 7   | 10 |                  |
| Robinson James         | 1   |    | 10               |
| Ruggles Nathaniel      | 7   | 11 | 4                |
| Rumley Thomas          |     | 15 | $\frac{1}{2}$    |
| Sally Thomas, Esq;     | 12  | 11 |                  |
| Solby William          |     | 14 |                  |
| Spreatly David         | 8   |    | 11               |
| Swallow Thomas         | 1   | 17 | 4                |
| Thomson John           |     | 19 | 11 $\frac{1}{4}$ |
| Twist William, Esq;    | 7   | 7  |                  |
| Worley Abraham, Esq;   | 16  | 10 | 8 $\frac{1}{2}$  |
|                        | 189 | 19 | 7 $\frac{1}{4}$  |

First, Begin with the Farthings and you find them amount to 27, which is 6 d. and 3 Farthings over; which 3 set under the Farthings thus ( $\frac{3}{4}$ ), and carry 6 to the Pence.

Then going to the Pence I say, 6 that I carry and 4 is 14, and 11 is 25, and 4 is 29, and 11 is 40 and 4 is 44, and 10 is 54, and 11 is 65. This being 5 above 60, I make a small Dot close to the 11, and carry the 5 that is over to the next Figure, saying 5 that I carry and 6 is 11, and 10 is 21, and 11 is 32, and 4 is 36, and 9 is 45, and 8 is 53, and 8 is 61. This being 1 more than 60, I make a Dot again close to the 8 and say, 1 that I carry and 10 is 11, and 6 is 17, and 11 is 28, and 7 is 35, and 9 is 44, and 8 is 52, and 5 is 57, and 11 is 68. This being 8 more than 60, I again make a Dot, saying 8 that I carry and 8 is 16, and 7 is 23, and 8 is 31. Now the Pence is 2 s. 7 d. Therefore I put down the odd 7 d. under the Pence, and carry the 2 s. to the Dots, counting 5 s. for every Dot which are three in Number, that is 15 s. and the 2 I carried to them is 17 s; this 17 I carry to the Shillings, and contrary to the other Methods, I now work cross-ways, taking the double Figures as I go along viz. the Right-hand Figure first, and then the Left-hand one belonging to it, counting it for 10.

So going to the Shillings, I say, 17 that I carry and 10 is 27, and 7 is 34, and 9 is 43, and the 10 on the Left hand of it is 53, and 7 is 60, and the 10 belonging to it is 70. This being 10 more than 60, I make a Dot close to the 7, and carry the 10, saying 10 that I carry and 4 is 14 and the 10 belonging to it is 24, and 11 is 35, and 5 is 40 and the 10 belonging to it is 50, and 11 is 61. So I make a Dot at the 11, as before, and proceed with 1, saying 1 that I carry and 10 is 11, and 11 is 22, and 10 is 29 and the 10 belonging to it is 39, and 5 is 44, and 10 is 52, and 10 is 62. So I make a Dot at the Ten, and carry the 2, saying 2 that I carry and 3 is 5 and the 10 belonging to it is 15, and 7 is 22 and the 10 belonging to it is 32, and 11 is 43, and 5 is 48 and the 10 belonging to it is 58, and 7 is 65 and the 10 belonging to it is 75. Therefore I make a Dot at the 17, and carry the 15 that are over and above 60, and say, 15 that I carry and 19 and the 10 belonging to it is 29, and 9 is 38 and the 10 belonging to it is 48, and 7 is 55 and the 10 belonging

so it is 65. This being 5 more than 60, I make a Dot at the 17, and carry 5, saying 5 that I carry and 7 is 12 and the 10 belonging to it is 22, and 6 is 28 and the 10 belonging to it is 38, and 4 is 42 and the 10 belonging to it is 52, and 7 is 59s. which make 21. 19s: which 19s. I set down under the Shillings, and carry the 21. to the Dots, and as every Dot in the Shillings is valued at 31. and they are 5 in Number making 151. the 21. added to them is 171. This 17 therefore I carry to the Pounds, casting them up by Tens, as in whole Numbers, and find them amount to 189l. 19s. 7d.  $\frac{1}{4}$ .

EXAMPLE 13, without Cyphers, according to the true Order of Book-keeping.

| £.    | s.   | d.                    |
|-------|------|-----------------------|
| 5478  | - 9  | - 6                   |
|       | 1    | - 19 - 5              |
|       |      | - 6 - 8 $\frac{1}{4}$ |
| 179   | -    | -                     |
|       | - 17 | - $\frac{1}{2}$       |
| 7     | - 5  | - 9 $\frac{1}{4}$     |
| <hr/> |      |                       |
| 5667  | - 18 | 5 $\frac{1}{4}$       |

EXAMPLE 13, with Cyphers, according to the common Custom of School.

| £.    | s.   | d.                 |
|-------|------|--------------------|
| 5478  | - 09 | - 06               |
| 0001  | - 19 | - 05               |
| 0000  | - 06 | - 08 $\frac{1}{4}$ |
| 0179  | - 00 | - 00               |
| 0000  | - 17 | - 00 $\frac{1}{2}$ |
| 0007  | - 05 | - 09               |
| <hr/> |      |                    |
| 5667  | - 18 | 50 $\frac{1}{4}$   |

Tho' it is not customary to use Cyphers in Addition of Money, yet in Weights and Measures they are often us'd, and the Learner, who teaches himself, may take his own Fancy.

How to prove Addition has been shewn already at the End of the Questions to exercise Addition of whole Numbers.

## SECTION V.

Of the Manner of drawing Bills, Notes, Receipts, &c.

1. Of contracted Words, and their Signification.

Note, 1. Bt. stands for Bought.

2. Dr. is Debtor. Cr. is Creditor.

K 2

3. Do.

3. Do. stands for Ditto, and signifies the same Thing Place, or Sort of Goods, as was wrote in the Line before; it is used by Merchants, Tradesmen, and Accountants, both in Books and Bills, to avoid writing the same Thing over so often.

4 Co. signifies Company; that is, when two or more are in Trade and in Partnership.

5. Messrs. signifies Messieurs, or Gentlemen concerned together in some Trade or Business, and is used with the foregoing Contraction, (Co.) on the Head or Front of the Bills, instead of writing all their Names at Length:

## A Linnen Draper's BILL.

## EXAMPLE 1.

Messrs. Aaron Nelson and Co. Bt. of John Sharp

|         |                              |                                |      |    |    |
|---------|------------------------------|--------------------------------|------|----|----|
| 1764.   | 4 Jan.                       | 11 Pieces of Irish, at 3l. per | } £. | s. | d. |
|         |                              | Pice ————                      | } 33 | -  | -  |
| 12      | 2 Ditto at Do.               | ————                           | 6    | -  | -  |
| 8 Feb.  | Long Lawn, as by Agreement.  |                                | 3    | -  | 15 |
| 12 Apr. | 2 Pieces of Check, as by Do. |                                | 1    | -  | 7  |
| 28      | 4 Do. as by Do.              | ————                           | 2    | -  | 2  |

This Bill as a common Sum in Addition of ?  
Money, is } 46 - 5 -

## EXAMPLE 2.

## A Stationer's BILL.

Mr Samuel Long Bt. of John Page.

|         |                           |                                |       |    |    |
|---------|---------------------------|--------------------------------|-------|----|----|
| 1764.   | May 19                    | 2 Ream of Fool's Cap superfine | } £.  | s. | d. |
|         |                           | Paper ————                     | } 1   | -  | 10 |
| June 12 | 4 Ditto                   | ————                           | 3     | -  | -  |
|         |                           | 20 Ream of coarse Brown        | 1     | -  | 10 |
| Aug. 14 | Sundry Goods, as per Bill | ————                           | 3     | -  | 19 |
|         |                           |                                | £. 10 | -  | 10 |

Note, Some Persons never use the Word To at the Beginning of the Bill. 'Tis used in Books of Accounts on the Dr. or Left-hand Side. The Word By is used on the Cr. or Right-hand Side.

E X A M P L E

# Practical Arithmetick.

## EXAMPLE 3.

### A Goldsmith's BILL.

Mr James Proud Bt. of Paul Fineshew.

1764.

|       |                             |    |   |        |
|-------|-----------------------------|----|---|--------|
| May 9 | 1 Diamond Ring              | 15 | - | -      |
|       | 2 Pair of Silver Salts      | 2  | - | 6      |
|       | 1 Quart Tankard             | 10 | - | 10     |
|       | 1 First Do.                 | 4  | - | 7 - 6  |
|       | 1 Dozen of Knives and Forks | 3  | - | 2 - 6  |
|       | 1 Silver Tea Kettle         | 5  | - | 5      |
|       | 12 Tea-Spoons, Tongs, and   | 2  | - | 1 - 15 |
|       | Cream-pot                   | 1  | - | 15     |
|       | Total £.                    |    |   |        |

### A Taylor's BILL. Ex. 4.

Mr Robert Patience Dr. to John Trimmer.

1764.

|         |                                        |   |   |       |
|---------|----------------------------------------|---|---|-------|
| Mar. 15 | 2 Yards of Cloth, at 18 s. per Yard    | 1 | - | 16    |
|         | Making your Coat                       |   | - | 8     |
|         | 4 Yards and a Half of Shaloon, at 2 s. | 1 | - | 9     |
|         | Buckram, Stay-tape and Canvas          |   | - | 3 - 6 |
|         | Silk, Twist and Mohair                 |   | - | 2 - 8 |
|         | Buttons to the same                    |   | - | 3 - 6 |
|         | Total £.                               |   |   |       |

From these four Examples any other Tradesman's Bill may be form'd in due Order. The Balancing any Reckoning of Account between Persons will be explained in substruction.

### The common Form of Receipts, and Notes of Hand.

Receipts are given according to the Sum paid, and the persons you receive it of, or for. The Stationer's Bill in x. 2. is 101. If he receives it in full, the Receipt will be thus;

August 6, 1762. Received of Mr Samuel Long Ten Pounds, in full of all Demands.

John Page.



If the Receipt be written upon the Bill itself, then this is better.

Received at the same Time the Contents in full.

John Page.

Ex 12. If only Part be received, then thus ;

August 16, 1764. Received of Mr Samuel Long Five Pounds, on Account.

John Page.

£. 5.

Ex. 3 If the Person, who receives the Money, be a Son or Servant, he must write thus ;

August 16, 1764. Received of Mr Samuel Long Ten Pounds in full, for my Father (or Master)

John Page, jun.

Ex. 4. For Rent.

June 14, 1764. Received of Mr John Lumley twelve Pounds ten Shillings, for Half a Year's Rent, due at Lady Day last.

Abraham Gripe

£. 12 - 10

Ex. 5. A Promissory Note of Hand.

September 20, 1764.

I promise to pay to Mr Timothy Blunt, or Order, the Sum of Ten Pounds on Demand, for Value received,  
by me Roger Wickstead.

Another.

September 20. 1764.

I promise to pay to Mr Timothy Blunt, or Order, the Sum of Ten Pounds, six Months after Date, for Value received,

by me Roger Wickstead.

If there is an Account of long standing, and the Parties come to a Reckoning, yet he who owes Money upon the

Balance

balance cannot then pay, the following Form is best, which may be drawn in the Creditor's Book before Witness.

August 16, 1764. Reckoned and balanced all Accompts, and I Samuel Long acknowledge myself to be indebted to John Page three Pounds ten Shillings, which I promise to pay on Demand, for Value received. Witness my Hand.

Test.

Samuel Long.

Abraham Justice.

Ex. 6. If you have Money in another Person's Hands, you may draw upon him for the Whole, or Part of it, in the following Manner :

Sir, Please to pay to Mr. John Page, or Bearer, three Pounds ten Shillings, and place it to the Accompt of

Your humble Servant,

To Mr. Jonathan Trusty.

Samuel Long.

Of the Value of the Coins used here, how they are expressed, and how set down.

A Port, or Portugal Piece, commonly called a Six and thirty, is set down 1 l. 16 s.

A double Port, commonly called a Three Pound Twelve, set down 3 l. 12 s.

A Moidore, commonly called a Seven and Twenty, is set down 1 l. 7 s.

A Guinea is so expressed, and is set down 1 l. 1 s.

A Crown is so expressed ; but set down 5 s.

Half a Crown is 2 s 6 d.

## SECTION VI.

### A VOIR DU POISE WEIGHT.

BY this all Grocery Goods, Cheese, Butter, Soap, Candles, Allom, Brass, Iron, Copper, Salt, Hemp, and such Sort of Goods are weighed. The Weights are Pounds, Hundreds, Quarters, Pounds, Ounces, and Drams, according to the following

### T A B L E.

## TABLE.

|             |        |                          |             |
|-------------|--------|--------------------------|-------------|
| 16 Drains   | } make | 1 Ounce,                 | marked thus |
| 16 Ounces   |        | 1 Pound,                 |             |
| 28 Pounds   |        | 1 Quarter of an Hundred, |             |
| 4 Quarters  |        | 1 Hundred Weight,        |             |
| 20 Hundreds |        | 1 Ton,                   |             |

Which should be got by Heart, as well as the rest. Sum in this are cast up as in Addition of Money, only you do by different Figures. One Example at large will be standing Rule; and for your further Information I have put, over every Row and Denomination, the Quantity you are to stop at, or work by:

## EXAMPLE 1.

| (10)  | (20) | (4)  | (28) |
|-------|------|------|------|
| Tons. | C.   | grs. | lb.  |
| 23    | 14   | 1    | 18   |
| 18    | 11   | 2    | 16   |
| 27    | 17   | 3    | 21   |
| 46    | 14   | 1    | 17   |
| 16    | 17   | 2    | 15   |
| 45    | 15   | 1    | 17   |
| 16    | 17   | 3    | 14   |

198 — 9 — 1 — 3

## EXAMPLE 2.

| (10) | (4)  | (28) | (10) |
|------|------|------|------|
| C.   | grs. | lb.  | oz.  |
| 42   | 1    | 17   | 10   |
| 17   | 2    | 19   | 14   |
| 21   | 3    | 22   | 11   |
| 17   | 2    | 17   | 15   |
| 24   | 1    | 22   | 15   |
| 65   | 3    | 17   | 13   |
| 24   | 1    | 21   | 10   |

I begin at the lbs. and say, 14 and 7 is 21, and the 18 belonging to it is 31; that is, 3 above 28; therefore, make a Dot against the 7, and carry the odd 3, saying 3 that I carry and 5 is 8; and the 10 belonging to it is 18, and 7 is 25, and the 10 belonging to it is 35, that is, 7 above 28; then I dot again, and carry 7, saying, and 1 is 8, and the 20 belonging to it is 28; this being just a Quarter of an Hundred, I make a Dot, and go to 16 and 5 is 21, and the 10 belonging to it is 31, that is, 3 above 28; I therefore let down the 3 at the Bottom of the Pounds, and count the Dots, which are 4, and which I carry to the Quarters saying, 4 and 3 is 7, and 1 is 8, and 2 is 10, and 1 is 11, and 3 is 14, and 2 is 16, and 1 is 17 Quarters. Now as 4 Quarters make an Hundred,

Ask how many Fours I can have in 17, and find 4 Fours, and 1 over, that is, 4 Hundred, 1 Quarter, which I place under the Row of Quarters, and carry the 4 to the Hundreds, which I cast up by Twenty, the same as in Addition of Money, saying 4 that I carry and 7 is 11, and 5 is 16, and 7 is 23, and 4 is 27, and 7 is 34 and 1 35 and 4 is 39; then I come back with the Tens, saying, 39 and 10 is 49, and 10 is 59, and so on, 69, 79, 89, 99, and 10 is 109, which is 5 Twenties, and 9 over; that is, 5 Tons, and 9 Hundred over, which 9 I place under the Hundreds, and carry 5 to the first Row of the Tens, and casting them up as Whole Numbers by Tens, find the the first Row 48, that is, 8, and I carry 4 to the next Row, which amounts to 19. Therefore the Total 198 Tons, 9 C. 1 qr. 3 lb.

Ex. 2. is left undone for Practice. Only let the Learner observe, that 10 is here set over the Hundreds Place, whereas in Ex. 1 it is 20. The Reason of this is, because whatever Name or Denomination stands first (that is, whatever you add up last) is always added up like whole Numbers, by Tens, be they Tons, Hundreds, Pounds, Shillings, Yards, Ells, or any Thing else.

**AVOIRDUPOIS Small Weight.**

This is chiefly used by those who deal in Silk, Worsted, Thread, &c. by Retail, or in small Quantities on, or from a Dram to Pounds. 16 Drams make an ounce, and 16 Ounces 1 Pound.

**EXAMPLE 1.**

| (10) | (16) | (16) |
|------|------|------|
| lb.  | oz.  | d.   |
| 2    | 10   | 5    |
| 4    | 7    | 3    |
| 1    | 6    | 11   |
| 6    | 9    | 0    |
| 3    | 7    | 9    |

18 — 8 — 12

**EXAMPLE 2.**

| (10) | (16) | (4)  |
|------|------|------|
| lb.  | oz.  | grs. |
| 3    | 14   | 2    |
| 1    | 11   | 1    |
| 3    | 9    | 0    |
| 2    | 01   | 2    |

Note, Worsted is weighed by Ounces and Quarters, as in Ex. no Drams being used here, nor in retailing many other commodities.

Of

## Of WOOL.

7 Pounds make 1 Clove

2 Cloves, or 14 lb. 1 Stone

2 Stone, or 28 lb. 1 Tod

6½ Tod 1 Wey

2 Weys 1 Sack

12 Sacks 1 Last.

Note, In some Places 7 Tod are allowed to 1 Wey and 12 Score; or 240 lb. is called a Pack of Wool.

Note farther,

A Firkin of Soap is 64 lb.

A Firkin of Butter 56 lb.

A Clove of Cheese 8 lb.

A Wey of Cheese in Essex is 32 Cloves, or 256 lb.

A Wey in some Parts of Suffolk is the same; but in other Parts of it, 42 Cloves, or 336 lb. make 1 Wey.

## TROY-WEIGHT.

By this Gold, Silver, Jewels, Electuaries, &c. and Quivers in general, are weighed.

## TABLE.

Note, { 24 Grains } make { 1 Penny-wt. } dw.  
 { 20 Penny-wts. } { 1 Ounce. } oz.  
 { 12 Ounces } { 1 lb. Troy. } lb.

Note 1. You need not point or dot at any Row in the first, where you do by 24; the others are easy common, the Penny-weights being cast up by are done the same as Shillings; and the Ounces being done by 12, are cast up like Pence, in Addition Money.



| (10)  | (12) | (20) | (24)  | (10)  | (12) | (20) | (24) |
|-------|------|------|-------|-------|------|------|------|
| lb.   | oz.  | dwt. | gr.   | lb.   | oz.  | dwt. | gr.  |
| 42    | — 11 | — 14 | — 18. | 647   | — 11 | — 17 | — 16 |
| 26    | — 9  | — 10 | — 21  | 196   | — 10 | — 15 | — 23 |
| 49    | — 10 | — 11 | — 11. | 494   | — 11 | — 19 | — 14 |
| 65    | — 8  | — 14 | — 12  | 195   | — 9  | — 15 | — 21 |
| 73    | — 9  | — 14 | — 16. | 219   | — 1  | — 11 | — 19 |
| 87    | — 11 | — 18 | — 11  | 648   | — 8  | — 15 | — 21 |
| <hr/> |      |      |       | <hr/> |      |      |      |
| 47    | — 2  | — 5  | — 17  |       |      |      |      |

Note 2. the Value of Gold and Silver.

| Gold.                                   |  | £. | s.  | d.  |
|-----------------------------------------|--|----|-----|-----|
| 1 Pound Weight of Gold is worth         |  | 48 | : 0 | : 0 |
| 1 Ounce                                 |  | 4  | : 9 | : 0 |
| 1 Penny-weight                          |  | 0  | : 4 | : 0 |
| 1 Grain                                 |  | 0  | : 0 | : 2 |
| Silver.                                 |  | £. | s.  | d.  |
| 1 Pound Weight of Silver is worth       |  | 3  | : 0 | : 0 |
| 1 Ounce                                 |  | 0  | : 5 | : 0 |
| 1 Penny-weight                          |  | 0  | : 0 | : 3 |
| 1 Grain about $\frac{1}{2}$ a Farthing. |  |    |     |     |

# APOTHECARIES WEIGHT.

By this Apothecaries mix and compound their Medicines, their Pound being the same as the Pound Troy, only differently divided; yet they buy and sell their Drugs by voirdupoise-Weight.

## The TABLE.

|            |          |                                       |    |
|------------|----------|---------------------------------------|----|
| 20 Grains  | } make { | 1 Scruple, thus marked $\mathfrak{S}$ | 0  |
| 3 Scruples |          | 1 Dram                                | 3  |
| 8 Drams    |          | 1 Ounce                               | 3  |
| 12 Ounces  |          | 1 Pound                               | 16 |

| (10) | (12) | (8) | (3) | (20) | (10) | (3) | (20) |
|------|------|-----|-----|------|------|-----|------|
| lb   | 3    | 3   | 9   | gr.  | 3    | 9   | gr.  |
| 42 — | 10 — | 7 — | 2 — | 19   | 18 — | 1 — | 14   |
| 17 — | 8 —  | 5 — | 2 — | 11   | 12 — | 2 — | 17   |
| 43 — | 7 —  | 6 — | 1 — | 10   | 41 — | 1 — | 10   |
| 15 — | 4 —  | 5 — | 1 — | 9    | 24 — | 2 — | 15   |
| 40 — | 11 — | 3 — | 1 — | 8    | 16 — | 1 — | 11   |
| 64 — | 9 —  | 6 — | 2 — | 15   | 17 — | 2 — | 15   |

225 — 5 — 4 — 0 — 12

### DRY-MEASURE.

By this all Dry Goods are measured, such as: Coal, Sand, Salt, Fruit, Oysters, Wheat, Barley, Peas, and other Grain, as by the following Tables.

TABLE 1.

|                           |   |      |                    |
|---------------------------|---|------|--------------------|
| 2 Pints                   | } | make | 1 Quart.           |
| 2 Quarts                  |   |      | 1 Pottle.          |
| 2 Pottles, or 8 Pints     |   |      | 1 Gallon.          |
| 2 Gallons, or 16 Pints    |   |      | 1 Peck.            |
| 4 Pecks                   |   |      | 1 Bushel.          |
| 4 Bushels                 |   |      | 1 Coomb.           |
| 2 Coombs, or 8 Bushels    | } | make | 1 Seam, or Quarter |
| 5 Quarters, or 40 Bushels |   |      | 1 Load.            |

TABLE 2. For Coals.

|                           |   |      |                       |
|---------------------------|---|------|-----------------------|
| 4 Pecks                   | } | make | 1 Bushel.             |
| 9 Bushels                 |   |      | 1 Quarter of a Chald. |
| 4 Quarters, or 36 Bushels |   |      | 1 Chaldron.           |
| Note, 5 Pecks             |   |      | 1 Bushel, WaterMe     |

EXAMPLES.

| oads. | grs. | B. | Pecks. | Chal. | grs. | Bufs. | Chal. | B. | Pecks. |
|-------|------|----|--------|-------|------|-------|-------|----|--------|
| 4     | 4    | 7  | 3      | 64    | 2    | 8     | 47    | 31 | 3      |
| 9     | 3    | 5  | 2      | 17    | 1    | 6     | 19    | 17 | 1      |
| 9     | 2    | 3  | 1      | 48    | 2    | 3     | 47    | 16 | 2      |
| 7     | 3    | 1  | 2      | 17    | 1    | 4     | 56    | 27 | 3      |
| 6     | 1    | 5  | 3      | 96    | 2    | 5     | 17    | 13 | 2      |
| 7     | 3    | 4  | 2      | 17    | 3    | 7     | 47    | 27 | 3      |
| 5     | 4    | 4  | 1      |       |      |       |       |    |        |

Observe, that

Score of Coals is 21 Chaldron, that is, those that buy 20 Chaldron have 21 for 20  
 Sack of Coals 3 Bushels  
 Sack of Corn in common 4 Bushels  
 Sack of Flour 5 Bushels  
 Load called a Market Load 5 Bushels  
 Load, in general means 40 Bushels  
 Wey is 10 Quarters, or 2 Loads 80 Bushels  
 Last in some Places is 12 Wey, viz. 960 Bushels

LIQUID MEASURE.

By this all Sorts of Wine, Spirituous Liquors and Beer and Ale are measured. But this is distinguished into Wine measure, by which not only Wine, but Cyder, Perry, Vinegar, and Milk, in London, are bought and sold.

TABLE of WINE MEASURE.

|                       |                          |
|-----------------------|--------------------------|
| Pints                 | Quart                    |
| Quarts                | 1 Gallon                 |
| Gallons               | 1 Anchor of Br. or Rum   |
| Gallons               | 1 Runlet                 |
| Gallons               | 1 Barrel of Wine or Vin. |
| Gallons               | 1 Tierce                 |
| Gallons               | 1 Hoghead                |
| Hhds. or 126 Gallons  | 1 But, or Pipe           |
| Pipes, or 252 Gallons | 1 Tun                    |

L

Note,

Note, A Puncheon is 8 Anchors, or 80 Gallons; any Cask between a Hoghead and a Pipe is called Puncheon:

And into

### WINCHESTER MEASURE, By which Malt Liquors are bought, and sold.

#### T A B L E.

|                                       |   |      |             |
|---------------------------------------|---|------|-------------|
| 2 Pints                               | } | make | 1 Quart.    |
| 4 Quarts                              |   |      | 1 Gallon    |
| 9 Gallons                             |   |      | 1 Firkin    |
| 2 Firkins, or 18 Gallons              |   |      | 1 Kilderkin |
| 2 Kilderkins, or 36 Gallons           |   |      | 1 Barrel    |
| 1 $\frac{1}{2}$ Barrel, or 54 Gallons |   |      | 1 Hoghead   |
| 2 Hhds. or 3 Barrels, or 108 Gall.    |   |      | 1 Butt      |
| 2 Butts, or 216 Gallons               | } | make | 1 Tun       |

#### E X A M P L E S.

| (10)  | (2)   | (1 $\frac{1}{2}$ ) | (2)   | (2)   | (9)   | (10)  | (3)  |
|-------|-------|--------------------|-------|-------|-------|-------|------|
| Butts | Hhds. | Bar.               | Kild. | Firk. | Gall. | Butts | Bar. |
| 15    | —     | 1                  | —     | 0     | —     | 1     | —    |
| 23    | —     | 0                  | —     | 1     | —     | 0     | —    |
| 41    | —     | 1                  | —     | 1     | —     | 1     | —    |
| 22    | —     | 1                  | —     | 0     | —     | 1     | —    |
| 7     | —     | 1                  | —     | 1     | —     | 0     | —    |
| 1     | —     | 0                  | —     | 1     | —     | 0     | —    |
| 112   | —     | 0                  | —     | 1     | —     | 1     | —    |

Note, That in gauging Beer and Ale in London, Gallons is a Barrel of Ale, and 36 a Barrel of Beer: in other Places 34 Gallons is a Barrel one with another and Common Brewers in the Country allow Virtual 36 Gallons of both Sorts to the Barrel.

#### C L O T H M E A S U R E

Is divided into Yards, Quarters, and Nails; also English, Ells Flemish, and French Ells, as by

The T A B L E.

|                            |        |                       |
|----------------------------|--------|-----------------------|
| 12 Inches and a Quarter    | } make | 1 Nail                |
| 16 Nails                   |        | 1 Quarter of a Yard   |
| 4 Quarters                 |        | 1 Yard                |
| 4 Quarters of a Yard       |        | 1 Ell Flemish Measure |
| 4 Quarters, or 1 Yd. 1 Qr. |        | 1 Ell English         |
| 4 Quarters                 |        | 1 French Ell          |

Note 1. That Things in common, such as Woollen, Tape, Cord, &c. are measured by the Yard; but Lands are in general measured by the Ell English, and Drapery by the Ell Flemish.

Note 2. 16 Nails make a Yard, 20 Nails an Ell English, and 12 Nails an Ell Flemish.

E X A M P L E S.

| (6)  | (4)    | (4)       | (10) | (5) | (4)      | (10) | (3) | (4) |
|------|--------|-----------|------|-----|----------|------|-----|-----|
| Qrs. | Nails. | Ells Eng. | Qrs. | N.  | Ells Fl. | Qrs. | N.  |     |
| 7    | 3      | 2         | 64   | 4   | 3        | 17   | 2   | 3   |
| 9    | 2      | 1         | 12   | 3   | 1        | 41   | 1   | 2   |
| 6    | 3      | 2         | 19   | 3   | 2        | 19   | 2   | 1   |
| 4    | 1      | 1         | 16   | 4   | 3        | 64   | 1   | 2   |
| 7    | 1      | 2         | 16   | 2   | 1        | 14   | 2   | 1   |
| 1    | 2      | 1         | 17   | 2   | 3        | 25   | 1   | 3   |

L O N G M E A S U R E,

Teaches the Length or Breadth of any Thing, and Distance of one Thing or Place from another as by

The T A B L E.

|                      |        |                                |
|----------------------|--------|--------------------------------|
| Barley Corns         | } make | 1 Inch                         |
| Inches               |        | 1 Foot                         |
| Feet                 |        | 1 Yard                         |
| Yards, or 6 Feet     |        | 1 Fathom                       |
| 1/2 Yards            |        | 1 Rod, Pole, or Perch          |
| Rods                 |        | 1 Furlong                      |
| Furlongs             |        | 1 Mile                         |
| Miles                |        | 1 League                       |
| Leagues, or 60 Miles |        | 1 Degree                       |
| Degrees              |        | The Circumference of the Globe |



Note 1. A Hand, or Hand's Breadth in Horsemanship is 4 Inches. A common Pace is two Feet six Inches. Geometrical Pace is five Feet.

Note 2. 60 Miles are here said to make one Degree. But, very nearly,  $69\frac{1}{2}$  Miles make but one Degree; so that the Globe of the Earth is about 25000 Miles round.

## EXAMPLES.

| (10)  | (20)  | (3)    | (8)  | (40)  | (10)  | (5)  | (3)   | (12)  |
|-------|-------|--------|------|-------|-------|------|-------|-------|
| Deg.  | Leag. | Miles. | Fur. | Rods. | Rods. | Yds. | Feet. | Inch. |
| 25    | —     | 19     | —    | 2     | —     | 7    | —     | 25    |
| 17    | —     | 14     | —    | 1     | —     | 5    | —     | 19    |
| 16    | —     | 8      | —    | 2     | —     | 8    | —     | 15    |
| 21    | —     | 5      | —    | 1     | —     | 4    | —     | 27    |
| 47    | —     | 7      | —    | 2     | —     | 1    | —     | 14    |
| 15    | —     | 10     | —    | 1     | —     | 5    | —     | 37    |
| <hr/> |       |        |      |       |       |      |       |       |
| 144   | —     | 7      | —    | 0     | —     | 3    | —     | 13    |

## LAND MEASURE.

Is almost the same as Long Measure; but as Inches and Barley Corns are never regarded, it is sufficient to give this

## TABLE.

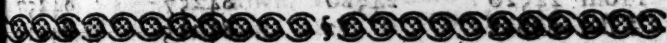
$5\frac{1}{2}$ , or 16 Feet  $\frac{1}{2}$   
 40 Rods or Poles  
 40 Rods in Length, and  
 1 in Breadth  
 4 Rods, or Quarters

} make  
 { 1 Rod, Pole, or Perch  
 { 1 Furlong in Length  
 { 1 Rod, or Quarter  
 { an Acre  
 { 1 Acre

## EXAMPLES.

| (10)  | (4)  | (40)  | (5)  | (10)  | (4)  | (40)           |
|-------|------|-------|------|-------|------|----------------|
| Acres | Rods | Poles | Yds. | Acres | Rods | Poles          |
| 7     | —    | 1     | —    | 14    | —    | 1              |
| 9     | —    | 3     | —    | 27    | —    | 2              |
| 4     | —    | 1     | —    | 29    | —    | 3              |
| 15    | —    | 2     | —    | 27    | —    | 4              |
| <hr/> |      |       |      |       |      |                |
| 37    | —    | 1     | —    | 18    | —    | $4\frac{1}{2}$ |

Note, In measuring Land we use an Iron Chain of 100 Links, which is 4 Rods or 22 Yards in Length: There are 10 Chains in Length and one in Breadth, make an Acre; and 80 Chains, in Length only, make a Mile, or 660 Yards.



# SUBTRACTION.

## SECTION I.

SUBTRACTION takes a less Number from a greater, to discover the Difference. To prove the Work, add the Difference to the less Number, and if the Sum be the same as the greater, the Work is right.

This is performed quite contrary to Addition; for in Addition you use the Word and, but here the Word from, thus 4 from 7, that is, 4 taken out of 7, there remains 3 for the Difference. Again, 5 from 10, there remains 5 and 6 from 14, there remains 8; and so for any other Numbers, as by the Examples:

EXAMPLE 1.

Ex. 2.

Ex. 3.

Ex. 4.

|                | £. | Yards | Ells | lbs.   |
|----------------|----|-------|------|--------|
| Greater Number | 27 | 95    | 468  | 441756 |
| Less Number    | 14 | 61    | 162  | 240256 |
| Difference     | 13 | 34    | 306  | 201500 |
| Proof          | 27 | 95    |      |        |

In Ex. 1. I say, 4 from 7, there remains 3; 1 from 3 there remains 2. To prove it I add the Difference to the less Number, saying 3 and 4 is 7, and 2 and 1 makes 3.

In Ex. 2. 1 from 5, there remains 4; 6 from 9, there remains 3. For Proof, I say, 4 and 1 is 5, 3 and 6 is 9, that is, 34 and 61 added together make 95.

In Ex. 3. I say, 2 from 8, there remains 6; 6 from 12 there remains 6; 1 from 4, there remains 3.

L 3

In

In Ex. 4. 6 from 6, there remains 0; 5 from 5, there remains 0; 2 from 7, there remains 5; 0 from 1, there remains 1; 4 from 4, there remains 0; 2 from 4, there remains 2.

| Ex. 5. with Cyphers. | Without. | Ex. 6. with Cyph. | Without. |
|----------------------|----------|-------------------|----------|
| From 24526           | 24526    | 84257             | 84257    |
| Take 00012           | 12       | 84215             | 84215    |
| Ans. 24514           | 24514    | 00042             | 42       |

## More EXAMPLES for Practice.

| <i>Yards</i> | <i>Ells.</i> | <i>Hundreds</i> |
|--------------|--------------|-----------------|
| From 47162   | 94785        | 347621          |
| Take 12412   | 3104         | 301             |

When the lower Figure is larger than the Top one then take the lower Figure out of the Number you do by which in Whole Numbers is 10, and to that Difference or Remainder add also the Top Figure; and that is the true Difference, and must be placed under the first Row. This is called Borrowing; therefore remember that you must always carry 1 to the next lower Figure for so doing. This will be best explain'd by Examples;

| Ex. 1          | Ex. 2        | Ex. 3         | Ex. 4           |
|----------------|--------------|---------------|-----------------|
| <i>£.</i>      | <i>Ells.</i> | <i>Yards.</i> | <i>Bushels.</i> |
| From 762       | 85420        | 760410        | 52170           |
| Take 145       | 17273        | 457146        | 34715           |
| Difference 617 | 68147        |               |                 |

In Ex. 1. I say 5 out of 2 I cannot have; but 5 out of 10 (which is what I do by here) and there remains 5; the Top Figure 2 makes 7, which 7 I place under the first Row, and carry 1 to the next lower Figure, saying that I carry and 4 makes 5, 5 from 6 and there remains 1; but now I carry nothing to the last lower Figure, cause I borrow'd nothing, therefore I only say in the Row, 1 from 7, and there remains 6.

In Ex. 2. I say 3 from 0 I cannot, but 3 from 10 and there remains 7, which I set down at Bottom; then I say that I borrow'd and 7 is 8, 8 from 2 I cannot, but 8 from ten and there remains 2, and the 2 at Top makes 4, which I set down at Bottom; then I go on, saying 1 that I borrow'd and 2 is 3, 3 from 4 and there remains 1, which 1 being set down, I say 7 from 5 I cannot, but 7 from 10 and there remains 3 and the Top Figure 5 makes 8, which 8 being set down I say, 1 that I carried and 1 is 2 from 8, and there remains 6.

Ex. 3. 6 from 0 I cannot, but 6 from 10 and there remains 4, and so on; but these may best be left undone for practice.

Another Way, when the lower Figure is largest.

This is the most expeditious Way and is done by adding to the Top-Figure.

EXAMPLES.

|            | £.    | Yards. | Ells.  |
|------------|-------|--------|--------|
| From       | 75043 | 41725  | 172560 |
|            | 27365 | 17258  | 87275  |
| Difference | 47678 | 24467  |        |
| Proof      | 75043 | 41725  |        |

First, I say 5 from 3 I cannot, but adding 10 to the 3 I say 5 from 13 and there remains 8; then I say 1 that I borrow'd and 6 is 7, 7 from 4 I cannot, but 7 from 14 and there remains 7; 1 I borrowed and 3 is 4, 4 from 0 I cannot, but 4 from 10 and there remains 6; 1 I borrow'd and 1 is 8, 8 from 5 I cannot, but 8 from 15 and there remains 7; 1 I borrow'd and 2 is 3, 3 from 7 and there remains 4.

Observe that the last lower Figure on the Left-hand is never larger than the Top one, when there is an equal Number of Figures.

~~But if I cannot find the lower Figure in the upper Figure, I must borrow of the next higher Figure, and then I can find it.~~

## SECTION 2. OF MONEY.

**S**UBTRACTION of Money is performed by Subtracting or taking every Denomination, whether Pounds, Shillings, Pence or Farthings, out of the upper Figures, and respectively placed.

When the lower Figures in the Farthings, Pence, or Shillings are smaller than the Top ones, only take out from the other, and the Remainder is the Difference.

| Ex. 1. |       |    |   | Ex. 2. |       |    |  | Ex. 3. |       |    |   |    |
|--------|-------|----|---|--------|-------|----|--|--------|-------|----|---|----|
| £.     | s.    | d. |   | £.     | s.    | d. |  | £.     | s.    | d. |   |    |
| From   | 9     | -  | 8 | -      | 11    |    |  | 643    | -     | 14 | - | 6½ |
| Take   | 7     | -  | 5 | -      | 6     |    |  | 231    | -     | 11 | - | 2½ |
|        | <hr/> |    |   |        | <hr/> |    |  |        | <hr/> |    |   |    |
| Rem.   | 2     | -  | 3 | -      | 15    |    |  | 412    | -     | 3  | - | 4½ |
|        | <hr/> |    |   |        | <hr/> |    |  |        | <hr/> |    |   |    |
| Proof  | 9     | -  | 8 | -      | 11    |    |  | 643    | -     | 14 | - | 6½ |

Ex. 1. I begin at the Pence and say, 6 from 11 and there remains 5, which I set under the Pence; then 8 Shillings from 8 and there remains 3; 7 Pounds from 9 and there remains 2.

It is prov'd like whole Numbers, by adding the Difference or what remains to the lower or less Number; as in the Pence, 5 and 6 is 11; in the Shillings 3 and 5 is 8; and in the Pounds, 2 and 7 is 9.

Ex. 2. I say 3 from 5 and there remains 2; then 7 from 15 and there remains 8; 7 from 8 and there remains 1; 2 from 4 and there remains 2.

Ex. 3. Here being Farthings, I begin with them and say 1 from 3 and there remains 2; 2 from 6 and there remains 4; 11 from 14 and there remains 3; 1 from 3 and there remains 2; 3 from 4 and there remains 1; 2 from 6 and there remains 4. So that the whole Difference or Remainder is 412l. 3s. 4d. ½; which added to the lower Sum, makes the Amount of the Top one for Proof.



But when the lower Figures in the Farthings, Pence or Shillings, are larger than the Top ones, then you take the lower Figure out of what you do by; that is, the lower Farthings out of 4; the lower Pence out of 12; and the lower Shillings out of 20, taking in the Top Figure besides. This will give the true Difference. But remember that you are always to carry 1 to the next Figure for borrowing, as in whole Numbers.

Ex. 4.

Ex. 5.

Ex. 6.

(10) (20) (12) (10) (20) (12) (10) (20) (12) (4)

£. s. d. £. s. d. £. s. d.

Rent 10 - 4 - 6 42 - 11 - 6 453 - 13 - 5  $\frac{1}{2}$

receiv'd 7 - 10 - 8 17 - 14 - 10 326 - 15 - 8  $\frac{1}{2}$

Due 2 - 13 - 10 24 - 16 - 8 126 - 17 - 8  $\frac{1}{2}$

Proof 10 - 4 - 6 42 - 11 - 6 453 - 13 - 5  $\frac{1}{2}$

Ex. 4. 8 from 6 I can't, but 8 from 12 (which is what I do by in Pence) and there remains 4 and the 6 at Top makes 10; then I carry 1 that I borrow'd to the Shillings, that I borrow'd and 10 is 11, 11 from 4 I can't, but 11 from 20 (which is what I do by here) and there remains 9 and the 4 at Top makes 13. Lastly, I borrow'd 7 is 8, 8 from 10 and there remains 2. The Proof is the same as before.

Ex. 6. 3 from 1 Farthing I cannot, but 3 from 4 (which is what I do by here) and there remains 1 and the 1 at Top makes 2; 1 I borrow'd and 8 is 9, 9 from 5 I can't, but 9 from 12 (what I do by here) 12, and there remains 3 and the 5 at Top is 8; 1 I borrow'd and 15 is 16, 16 from 13 I can't, but 16 from 20, and there remains 4 and the 13 at Top makes 17; 1 I borrow'd and 6 is 7, 7 from 3 I can't, but 7 from 13 and there remains 6; or 7 from 10 and there remains 3 and the 3 at Top is 6; 1 I borrow'd and 2 is 3, 3 from 5, and there remains 2; 3 from 4 (for 1 borrow'd) and there remains 1.

For Proof I say, 2 and 3 Farthings make 5, which being 1 more than a Penny, I set down the 1 Farthing and carry the Penny to the Pence; saying 1 I carry and 8 is 9, 8 is 17: This being 5 Pence more than a Shilling, I set

set down the 3 Pence and carry 1 to the Shillings, saying, 1 I carry and 17 is 18 and 15 is 33; this being 13 above 20 Shillings or a Pound, I set down 13 and carry 1 to the Pounds, saying, 1 and 6 is 7 and 6 is 13; this being above 10, I set down 3, and carry 1 to 2 is 3 and 2 is 5, 1 and 3 is 4.

## EXAMPLES for Practice.

| £.       | s.  | d. | £. | s.       | d.   |    |    |
|----------|-----|----|----|----------|------|----|----|
| Borrow'd | 217 | 10 | 0  | Debtor   | 1000 | 0  | 0  |
| Paid     | 109 | 15 | 8½ | Creditor | 970  | 15 | 6½ |

Question. A lent B. £300. and some Time after lent him 100 Guineas more: B. paid him at 3 several Times each 100 Guineas, and at another Time gave him a Draught or Note upon C. for £50. and sold him as many Goods as came to £34 4 6. I demand how the Balance stands between them?

Rule. Add the two Sums together which A lent B, you will find them to be £400. Then set all that B. paid in Cash, and the Draught and Goods, all under one another, and add them together; they make £399 4 6. This done, set £399 4 6 under £400, and subtract therefrom, and you will find that there remains due to A. on the Balance £5 15 6.

## ANVOIR DUPOISREWBIGHT.

| Tons   | C. | qr. | lb. | C. | qr.    | lb. | oz. |    |    |   |
|--------|----|-----|-----|----|--------|-----|-----|----|----|---|
| Bought | 17 | 11  | 1   | 15 | Bought | 47  | 1   | 17 | 11 | 1 |
| Sold   | 14 | 17  | 3   | 21 | Sold   | 19  | 0   | 25 | 10 | 1 |

Unfold. 2 - 13 - 1 - 22

Unfold.

We shall work only the first Example; because all other Sums in every one of the Rules, whether Troy Weight or Dry, or Wine, or Winchester, or Cloth, or Long, or Land Measure, are done in the same Manner.

21 from 15 I can't, but 21 from 28, (which is what I do by here) and there remains 7, and 15 at Top make 22: Then I carry 1 to 3 is 4, 4 from 1 I can't, but 4 from 4, (which is what I do by at qrs.) and there remains

ains 0, but the 1 at Top is 1, which I set down; 1 I borrowed and 17 is 18, 18 from 11 I can't, but 18 from 0, and there remains 2, and the 11 at Top makes 13; I borrowed and 4 is 5, 5 from 7, and there remains 2; 1 from 1, and there remains Nothing.

I shall add some Examples, and if you should forget that you do by, turn to your Tables in Addition.

**TROY WEIGHT.**

|        | lb. | oz. | dw. | gr. |        | lb. | oz. | dw. | gr. |
|--------|-----|-----|-----|-----|--------|-----|-----|-----|-----|
| Bought | 14  | 5   | 15  | 14  | Bought | 214 | 10  | 17  | 11  |
| Sold   | 9   | 9   | 13  | 17  | Sold   | 109 | 10  | 17  | 15  |
| <hr/>  |     |     |     |     | <hr/>  |     |     |     |     |
| Rem.   | 4   | 8   | 1   | 21  | Rem.   |     |     |     |     |

**DRY MEASURE.**

|        | Loads | Bush. | Pecks | Pints |        | Gbal. | Bush. | Pecks |
|--------|-------|-------|-------|-------|--------|-------|-------|-------|
| Bought | 42    | 17    | 2     | 12    | Bought | 291   | 21    | 2     |
| Sold   | 17    | 34    | 2     | 14    | Sold   | 173   | 27    | 3     |
| <hr/>  |       |       |       |       | <hr/>  |       |       |       |
| Unfold | 24    | 22    | 3     | 14    | Unfold |       |       |       |

**WINE MEASURE.**

|        | Bulls | Hbds. | Gall. | Pints |        | Hbds. | Gall. | Pints |
|--------|-------|-------|-------|-------|--------|-------|-------|-------|
| Bought | 14    | 1     | 47    | 0     | Bought | 64    | 35    | 1     |
| Sold   | 9     | 0     | 51    | 5     | Sold   | 17    | 46    | 2     |
| <hr/>  |       |       |       |       | <hr/>  |       |       |       |
| Unfold | 5     | 0     | 58    | 3     | Unfold |       |       |       |

**WINCHESTER MEASURE.**

|          | Bar. | Gall. | Pints |          | Bulls | Hbds. | B. | Gall. |
|----------|------|-------|-------|----------|-------|-------|----|-------|
| Brewed   | 124  | 21    | 4     | Brewed   | 21    | 1     | 1  | 26    |
| Sold out | 92   | 27    | 6     | Sold out | 15    | 1     | 0  | 26    |
| <hr/>    |      |       |       | <hr/>    |       |       |    |       |
| Unfold   | 31   | 29    | 0     | Unfold   |       |       |    |       |

Note, Here are 36 Gallons reckoned to the Barrel.

**CLOTH**

## CLOTH MEASURE.

|        | <i>Yds.</i> | <i>qrs.</i> | <i>Nails</i> | <i>Ells Eng.</i> | <i>qrs.</i> | <i>N.</i> | <i>Ells Fl.</i> | <i>qrs.</i> |
|--------|-------------|-------------|--------------|------------------|-------------|-----------|-----------------|-------------|
| Bought | 147         | - 1         | - 0          | 47               | - 1         | - 3       | 47              | - 2         |
| Sold   | 96          | - 3         | - 2          | 18               | - 2         | - 3       | 20              | - 2         |
| Rem.   | 50          | - 1         | - 2          |                  |             |           |                 |             |

## LONG MEASURE.

|      | <i>Deg.</i> | <i>Leag.</i> | <i>Miles</i> | <i>Fur.</i> | <i>Rods</i> | <i>Yds.</i> | <i>Feet</i> | <i>Inch.</i> | <i>B.C.</i> |
|------|-------------|--------------|--------------|-------------|-------------|-------------|-------------|--------------|-------------|
| From | 471         | - 14         | - 1          | - 3         | - 17        | - 2         | - 1         | - 10         | - 1         |
| Take | 167         | - 17         | - 1          | - 5         | - 21        | - 3         | - 1         | - 10         | - 2         |
| Rem. | 303         | - 16         | - 2          | - 5         | - 35        | - 3         | - 2         | - 11         | - 2         |

## LAND MEASURE.

|      | <i>Acres</i> | <i>Roods</i> | <i>Poles</i> | <i>Yds.</i> | <i>Acres</i> | <i>Roods</i> | <i>Poles</i> |
|------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|
| From | 471          | - 2          | - 15         | - 3         | 47           | - 1          | - 15         |
| Take | 196          | - 2          | - 26         | - 4         | 19           | - 2          | - 15         |
| Rem. | 271          | - 3          | - 28         | - 4         |              |              |              |

## MULTIPLICATION.

## SECTION I.

**M**ultiplication is short Addition, and tells the Product of a Sum in one Line, which would require several Additions. In it these three Things are carefully to be observed, 1. The Multiplicand, which stands at Top, and is the Number to be multiplied, 2. The Multiplier, or Sum you multiply by. 3. The Product or Answer, which is the Multiplicand multiplied. For Instance,

Take any two Numbers, suppose 8 and 3, I set down 8 and place 3 under it: So 8 is the Multiplicand, 3 is the Multiplier, and 24 is the Product or Answer, because 3 Times 8 is 24. The following Table is to be got by He

MULTIPLICATION TABLE.

once 1 is 1

|   |    |
|---|----|
| 2 | 4  |
| 3 | 6  |
| 4 | 8  |
| 5 | 10 |
| 6 | 12 |
| 7 | 14 |
| 8 | 16 |
| 9 | 18 |

|         |         |
|---------|---------|
| 5 Times | 5 is 25 |
|         | 6 is 30 |
|         | 7 is 35 |
|         | 8 is 40 |
|         | 9 is 45 |

|          |           |
|----------|-----------|
| 9 Times  | 9 is 81   |
| 10 Times | 10 is 100 |
| 11 Times | 11 is 121 |
| 12 Times | 12 is 144 |

Table of Twelves.

|   |    |
|---|----|
| 3 | 9  |
| 4 | 12 |
| 5 | 15 |
| 6 | 18 |
| 7 | 21 |
| 8 | 24 |
| 9 | 27 |

|         |         |
|---------|---------|
| 6 Times | 6 is 36 |
|         | 7 is 42 |
|         | 8 is 48 |
|         | 9 is 54 |

|    |     |
|----|-----|
| 2  | 24  |
| 3  | 36  |
| 4  | 48  |
| 5  | 60  |
| 6  | 72  |
| 7  | 84  |
| 8  | 96  |
| 9  | 108 |
| 10 | 120 |
| 11 | 132 |
| 12 | 144 |

|   |    |
|---|----|
| 4 | 16 |
| 5 | 20 |
| 6 | 24 |
| 7 | 28 |
| 8 | 32 |
| 9 | 36 |

|         |         |
|---------|---------|
| 7 Times | 7 is 49 |
|         | 8 is 56 |
|         | 9 is 63 |
| 8 Times | 8 is 64 |
|         | 9 is 72 |

1. To multiply by single Figures.

Multiply every Figure in the Multiplicand by the Figure the Multiplier, carrying 1 for every Ten, as in Addition Whole Numbers, and you have the Product or Answer.

Ex. 1.

|              |    |
|--------------|----|
| Multiplicand | 17 |
| Multiplier   | 5  |
| Product      | 85 |

Ex. 2.

|              |     |
|--------------|-----|
| Multiplicand | 78  |
| Multiplier   | 6   |
| Product      | 468 |

Begin with the Multiplier, saying 5 Times 7 is 35; I down the 5 and carry 3, saying 5 Times 1 is 5 and the 3 I carried is 8: So the Product or Answer is 85.

M

In



In Ex. 2. I say, 6 Times 8 is 48, that is 8 and I carry 4; then 6 Times 7 is 42 and 4 that I carried is 46: So the Product is 468.

The Work may be prov'd by Addition. Set down five Times on your Slate, cast up the Numbers and see if it does not amount to 15. And so of the other. Or, you may set the Multiplicand below and the Multiplier at Top, changing the one for the other, and go over it again above: If the Product be the same you must be right. And this is the readiest Method.

$$\begin{array}{r} \text{Ex. 3.} \\ \text{Multiply } 472 \\ \text{by } 8 \\ \hline \end{array}$$

Answer 3776

$$\begin{array}{r} \text{Ex. 4.} \\ \text{Multiply } 249070 \\ \text{by } 9 \\ \hline \end{array}$$

Ans. 2241630

$$\begin{array}{r} \text{Ex. 5.} \\ \text{Multiply } 590407 \\ \text{by } 7 \\ \hline \end{array}$$

Ans. 4132849

Ex. 3. I say, 8 Times 2, (or Twice 8) is 16, 6 and I carry 1; 8 Times 7 is 56 and 1 I carried is 57; that is 7 and I carry 5; then 8 Times 4 is 32, and 5 I carried is 37.

Ex. 4. 9 Times 0 is 0; 9 Times 7 is 63, that is 3 and I carry 6; 9 Times 0 is 0, but the 6 I carried is 6; 9 Times 9 is 81, that is 1 and I carry 8; 9 Times 4 is 36 and 8 I carried is 44; that is 4 and I carry 4; 9 Times 2 is 18 and 4 I carried is 22.

Ex. 5. 7 Times 7 is 49, that is 9 and I carry 4; 7 Times 0 is 0, but the 4 I carried is 4; 7 Times 4 is 28 that is 8 and I carry 2; 7 Times 0 is 0, but the 2 I carried is 2; 7 Times 9 is 63, that is 3 and I carry 6; 7 Times 5 is 35 and 6 I carried is 41.

#### EXAMPLES for Practice.

$$\begin{array}{r} \text{Multiply } 49997296 \\ \text{by } 9 \\ \hline \end{array}$$

Ans.

$$\begin{array}{r} \text{and } 94171470 \\ \hline \end{array}$$

Ans.

$$\begin{array}{r} \text{Multiply } 42576 \\ \text{by } 12 \\ \hline \end{array}$$

Ans.

$$\begin{array}{r} \text{and } 994070 \\ \text{by } 12 \\ \hline \end{array}$$

Ans.

$$\begin{array}{r} \text{and } 99807 \\ \text{by } 12 \\ \hline \end{array}$$

Ans.

2. Of multiplying by several Figures.

When there are several Figures in the Multiplier, begin at the first Figure in the Units Place, and multiply it through every Figure of the Multiplicand, as before. This done, multiply every Figure of the Multiplicand by the second Figure of the Multiplier; only observe let the first Figure of the second Row under the Tens Place of the first Row. Thus you go on with the third Figure of the Multiplier, placing the Units Place of each succeeding Row under the Tens Place of the Row above it, &c. Then draw a Line under all the Rows of Figures, add them together and the Total is the Product or Answer.

Be sure to set your Figures right under one another, or in a larger Sum you will be puzzled to add the Work together.

EXAMPLES with several Figures.

Multiply 89  
by 47

Proof.  
Multiply 47  
by 89

623  
358  
4183

423  
376  
4183

I say, 7 Times 9 is 63, that is 3 and I carry 6; 7 Times is 56 and 6 I carried is 62, which I set down, the first Row being finish'd; Then I take the second Figure of the Multiplier, saying, 4 Times 9 is 36, which 6 I set down under the Tens Place of the first Line and carry 3; then I say, 4 Times 8 is 32 and 3 that I carried is 35, placing the 5 under the 6, and the 3 quite out on the left Hand. Lastly I add up these 2 Sums, saying 3 is 3; 6 and 2 is 8; and 6 is 11, that is 1, and I carry 1 and 3 is 4.

EXAMPLE.

Multiplicand 895  
Multiplier 798

Proof.  
Multiplicand 798  
Multiplier 893

7460  
8055  
6268  
Product 714210

6990  
7182  
6384  
The same 714210

M 2

8 Times

8 Times 5 is 40, that is 0 and I carry 4; 8 Times 72 and 4 I carried is 76, that is 6 and I carry 7; 8 Times 8 is 64 and 7 I carried is 71, which I set down. Then I take the second Figure, 9 Times 5 is 45, which I set under the Tens Place of the first Line, and carry 4; 9 Times 7 is 63 and 4 I carried is 67, that is 7 and I carry 6; 9 Times 8 is 72, and 6 I carried is 78. I come now to the last Figure of the Multiplier; 7 Times 5 is 35, which I set under the second Figure of the last Line, and carry 3; 7 Times 7 is 49 and 3 I carried is 52, that is 2 and I carry 5; 7 Times 8 is 56 and 5 I carried is 61, which I set down; then cast up the 3 Sums in Order, and the Product is 714210.

### EXAMPLES for Practice.

**Multiply 4567879**  
**by 45759**

Multiply  $\times$  9567950  
by 32796

### 3. Of Cyphers between the Figures &c.

The most difficult Thing in this Rule is, when the Multiplier has some Figures, some Cyphers. Therefore serve carefully the Work of an Example or two and you will soon understand it.

Ex. 1.  
Muirpiy 49657  
by 30705  
248285  
3475990  
1489710

Ex. 2.  
Multiply 756496  
by 5003007

---

3782482500  
2269489500  
529547500

Anf. 1524718185

Anf. 378475728497550

**Ex. 1.** I begin at the 5 and multiply all the Top-Fig by it as before: Now as the next Figure of the Multi is a Cypher, I cannot multiply that, because it will duce Nothing: Therefore I bring it down, that is, I Cypher under the Figure 8, and then begin to multiply the 7, saying, 7 Times 7 is 49, that is 9 and I carry which 9 I set down in the same Line on the left-hand of

Cypher, and go on to multiply by the 7; then as the next figure is a Cypher again, I begin a third Line with it below, and multiply by the 3, the Product of which I set in the same Line; add up the Whole, and the Work is done.

Ex. 2. Begins with 3 Cyphers in the Multiplier; therefore I bring them all down, beginning the first Line underneath with them, then multiply by the 7, the Product of which I set in the same Line with the Cyphers ranging to the left-hand. Then coming to 2 Cyphers more, I clap them also underneath, beginning a second Line with them and go on to multiply by 3, placing the Product of it on the left of the 2 Cyphers. Then meeting with other 2 Cyphers, begin a third Line with them and proceed to multiply by 3, ranging the Product of it on the left-hand of the two last Cyphers.

EXAMPLES for Practice.

Multiply 570965  
by 2400300

and 71900072  
by 5000960000

4. Of Contractions or Compendiums.

When any Number is to be multiplied by 10, 20, 30, 40, 50, 60, 70, 80, 90, 120, 1200, set the Cyphers out, and multiply by the Figure or Figures, placing the Product on the left Hand of the Cyphers, as before.

Multiply 275  
by 20

and 3275  
by 90

and 6759  
by 1200

Answer 5500

Ans. 294750

Ans. 8110800

When you multiply by 1, the Multiplicand itself is the answer; if by 10, add one Cypher to the Multiplicand; if by 100, add two Cyphers; if by 1000, add three Cyphers: See the Work two Ways.

Multiply 1753  
by 100

1753  
1000

1753  
10000

175300

1753000

17530000

M. 3

Or

Or rather thus:

Multiply 1753 by 1 Ans. (the same, viz. 1753)  
 by 10 Add 1 Cypher, Ans. 17530  
 by 100 Add 2 Cyphers, Ans. 175300  
 by 1000 Add 3 Cyphers, Ans. 1753000  
 by 10000 Add 4 Cyphers, Ans. 17530000

And thus for as many Cyphers as you please.

In Questions performed by Multiplication, multiply the Price by the given Number or Quantity, and carry 1 every 4, 12, and 20, as in Addition of Money, and every 10 in the Pounds, as in whole Numbers.

Quest. 1. What cost 3 Ells, at 0 - 5 - 3 an Ell?

$$\begin{array}{r} \text{£. s. d.} \\ 0 - 5 - 3 \\ \times 3 \\ \hline 0 - 15 - 9 \end{array}$$

Here I say, 3 Times 3 is 9 Pence, this I set down under the Pence, and say, 3 Times 5 is 15 Shillings, which I set down, and the Work is done.

Whether it be Ells, Yards, Grofs, or Gallons, the Case is the same.

2. What come 5 Grofs of Corks to at 0 6 8 a Grof?

$$\begin{array}{r} \text{£. s. d.} \\ 0 - 6 - 8 \\ \times 5 \\ \hline 1 - 13 - 4 \end{array}$$

Here I say, 5 Times 8 is 40 Pence (which is 3s. 4d.) therefore I set down 4 under the Pence, and carry 3 then 5 Times 6 Shillings is 30 and 3 I carried is 33 Shillings, which is 11. 13s.

3. What cost 7 Reams of Paper, at 0 - 8 - 9 a Ream?

$$\begin{array}{r} \text{£. s. d.} \\ 0 - 8 - 9 \\ \times 7 \\ \hline 3 - 1 - 3 \end{array}$$



Here 7 Times 9 is 63 Pence (which is 5s. 3d.) that is and I carry 5; then 7 Times 8 is 56 Shillings and 5 I carried is 61 Shillings, which is 3l. 1s.

4. What cost 9 Gallons of Brandy, at 6s. 8d. a Gallon?

3 14 34

Here 9 Farthings is 2 Pence Farthing; I set down the Farthings and carry 2; then 9 Times 3 is 27 Pence and 2 carried is 29 Pence (which is 2s. 5d.) therefore I set down the 5d. and carry 2; then 9 Times 8 is 72 Shillings and 2 I carried is 74s. which is 3l. 14s.

When you have double Figures in the Shillings, as 14, 17, 18, or the like, multiply them like whole Numbers, and then cast out the Twenties, that is, count how many Times Twenty you can have in the Number, and it is done.

Quest. 5. What cost 5 Sheep at 17s. 6 each?

Ans. 9 - 7 - 6

Here, 5 Times 6 is 30 Pence (which is 2s. 6d.) that is and I carry 2; then I multiply the whole 17 by 5, saying Times 7 is 35 and the 2 I carried is 37, that is 7 and I carry 3; then 5 Times 1 is 5 and 3 I carried is 8 that is 87 Shillings which is 4l. 7s. that is 7 set down and I carry 4; then 5 Times 1 is 5 and the 4 I carried is 9.

Or thus: I multiply the 7 by the 5, setting down the product on a Slate or Piece of Paper, saying, 5 Times 7 is 35 and 2 I carried is 37 Shillings or 1l. 17s. then I say 5 Times 10 is 50 Shillings, or 2l. 10s. Add this to 1l. 17s. and it makes 4l. 7s. as before.

When there are 2 Figures to multiply by, the given quantity being more than 12, and containing any such Number as can be found in the Multiplication Table; then find any 2 Numbers, which, multiplied together, will make the given Number, then multiply the Price by any one

one of those Figures, and afterwards multiply that Product by the other Number, and the last Product is the Answer.

— Suppose I am to multiply by 15: I find 3 Times 15: Therefore I multiply by 3 first, and the Product that I afterwards multiply by 5, which gives the right Product of the whole; because three Times 5, or 5 Times 3 is 15. Thus,

Quest. 6. What cost 15 Ells of ?  $\text{£. s. d.}$   
Holland, at ————  $\text{50} - 7 - 6$  an Ell

Here 3 Times 5 is 15, therefore I multiply first by 3

The Price of 3 Ells then is  $\text{1} - 12 - 6$   
Which multiply by 5

Which gives the Price of 15 Ells  $\text{5} - 12 - 6$  And

Or suppose I was to multiply by 24: I find that Times 6 is 24; therefore I first multiply by 4, and have cast up the Product, multiply that by 6, and the Business is done. Thus,

7. What cost 24 Chaldrons of Coals, at  $\text{1} - 11 - 6$  a Ch  
4 Times 6 is 24, therefore multiply first by 4

Thus the Price of 4 Chaldrons is  $\text{6} - 6 - 0$   
Multiply this by 6

It gives the Price of 24 Chaldrons  $\text{37} - 16 - 0$

But when the Number does not fall under the common Course of the Multiplication Table, such as 17, 38, or the like; then take any two Figures that will come nearest to the Number (but not exceeding it) and work with them, then add the Price to that Product as many Times as there are odd Numbers. Thus,

8. What cost 17 Grofs of Corks, at 6 10 6<sup>1</sup>/<sub>2</sub> a Grofs?  
Times 4 is 16 and 1 is 17, mult. by

thus I find the Price of 4 Grofs  
this multiplied by

$$\begin{array}{r} 6 \ 10 \ 6\frac{1}{2} \\ \times 4 \\ \hline 2 \ 2 \ 2 \\ \hline 8 \ 8 \ 8 \\ \hline 0 \ 10 \ 6\frac{1}{2} \end{array}$$

gives the Price of 16 Grofs

add the Price of 1 Grofs

and the Price of the 17 is

$$\begin{array}{r} 8 \ 19 \ 2\frac{1}{2} \end{array}$$

9. What cost 38 Load of Hay, at 1 11 6 a Load?  
Times 6 is 36 and 2 is 38, multiply by

This gives the Price of 6 Load

Multiply this by

$$\begin{array}{r} 1 \ 11 \ 6 \\ \times 6 \\ \hline 9 \ 9 \ 6 \\ \hline 56 \ 14 \ 0 \\ \hline 3 \ 3 \ 0 \end{array}$$

And it gives the Price of 36 Load

Multiplying the Price 11. 11s. 6d. by 2, gives

And the Price of 38 Load is

$$\begin{array}{r} 56 \ 14 \ 0 \\ + 2 \ 3 \ 0 \\ \hline 59 \ 17 \ 0 \end{array}$$

## DIVISION.

### SECTION I.

**D**IVISION is the Reverse of Multiplication; for as any Sum is there encreas'd as many Times as the figure you multiply by; so in Division the Number is divided into as many Parts as the Value of the Figure you divide by.

There are 4 Things necessary to be known in this Rule;  
1. The Dividend, or Sum given to be divided;  
2. The Divisor, or the Number you are to divide by;  
3. The Quotient or Answer, which shews how many Times the Divisor is contained in the Dividend; or into how many Parts the Dividend is divided;  
4. The Remainder, which is a fractional Part of the Quotient.

To

To explain these, Let us take any two Numbers, suppose 24 and 6: Now 24 is the Dividend, and 6 is the Divisor. Then I ask how many Times 6 can I have in 24 and the Answer is 4; which 4 is called the Quotient. Or, suppose I was to divide 108 by 12, or, into 12 Parts, then every Part will be 9; for 12 Times 9 is 108. Now 108 is the Dividend or Sum to be divided; 12 is the Divisor or what you divide by, and 9 is the Quotient.

Of dividing by single Figures in one Line only.

Rule. First, Ask how many Times the Divisor is contained in the first Figure of the Dividend; and if the Divisor be larger than the first Figure of the Dividend, then see how many Times you can have it in the two first Figures in the Dividend, and set the Figure down accordingly: And if any Thing remains from the first Figure in the Dividend, carry it to the second; and if any Thing remains in the second Figure, carry it to the third, remembering always in this short Division, that if 1 remains you call it 10, if 2 remains you call it 20, if 3, 30, and so on; carrying the Remainder of one Figure to another in your Mind.

These Figures 2's are called Two's, 3's Three's, 4's Four's, and so on.

Ex. 1. Dividend.

Divisor 3) 39

Quotient 13 Anf.

Proof

39

Ex. 2. Dividend.

Divisor 4) 168

Quotient 42

4

Proof 168

In Ex. 1. I ask how many 3's I can have in 3; or I say the 3's in 3 is once. Therefore I set down 1 under the first Figure of the Dividend; and as there remains Nothing over, I go on to the next Figure, saying the 3's in 9 is 3 Times 3 and nothing over, therefore I set down 3 under the 9, and it is done.

In Ex. 2. I say, the 4's in 16 is 4 Times 4, but I cannot have 4 Times 4; therefore I set down 4 under the 16, and as nothing remains I only say, the 4's in 8 is 2 Times 4; therefore I set down 2 under the 8, and it is done.

ce; therefore I set down 2 under the 8; and 'tis done.  
To prove it, I multiply the Quotient 42 by the Divisor 4,  
and it 168 as the Dividend.

Ex. 3. Dividend.  
Divisor 8) 37192

Ans. 4649  
37192

Proof 37192

Ex. 4. Dividend.  
Divisor 9) 245052

Ans. 27228  
245052

Proof 245052

Ex. 3. I divide by 8, saying, the 8's in 37 I can't, but  
8's in 37 is 4 Times 8 is 32 and 5 over; I therefore set  
down 4 under the 7, and carry 5 to the next Figure,  
which is 1, and which I now call 51 (for what you carry  
from one Figure you must place before the next); then I  
say the 8's in 51 is 6 Times 8 is 48, and 3 over; which 3 I  
carry to the 9, and call it 39; therefore I say, the  
8's in 39 is 4 Times 8 is 32, and 7 over; this 7 I now  
carry before the 2 and call it 72; then I say, the 8's in 72  
is 9 Times, and 'tis done. To prove it, I multiply the  
Quotient or Answer by the Divisor 8, and find the Product  
the same as the Dividend.

Ex. 4. I say, the 9's in 2 I can't, but the 9's in 24 is  
2 Times 9 is 18 and 6 over; which 6 I place under the 4,  
and carry the 6 to the next Figure, which is 5, and call  
it 56; then I say the 9's in 56 is 6 Times 9 is 54 and  
2 over; which 2 I place before the Cypher (0) and it is 20;  
then I say the 9's in 20 is twice 9 is 18 and 2 over; which  
2 I carry to the 5 and it is 25; then I say, the 9's in 25  
is twice 9 is 18 and 7 over; which 7 I set before the last  
Figure 2 and it is 72; then I say, the 9's in 72 is just 8  
Times. To prove it, multiply the Answer by 9, and the  
Product will be the same as the Dividend.

Ex. 5. Dividend.  
Divide by 7) 417296

Ans. 59613 - 5  
417296

Proof 417296

Ex. 6. Dividend.  
Divide by 9) 9471636

Ans. 1052404  
9471636

Proof 9471636

In



In Ex. 5 there is 4 remains at last, therefore I set it the End of the Answer, parting it with a Stroke; thus, and when I prove the Work, I multiply by 7, and in the Remainder 5, saying, 7 Times 3 is 21 and 5 is 26 and I carry 2, &c.

More EXAMPLES for Practice.

$$7) 697220716$$

$$9) 407217943$$

Let it be required to divide 1479908 by 12: I set down thus,

Ex. 9.

$$12) 1479908$$

Ex. 10.

$$12) 59904965$$

$$123325-8$$

$$4992080-5$$

Here I divide by 12, saying, the 12's in 14 is once and 2 over; 1 I set down, 2 I carry to the 7 and it is 27, then I say, the 12's in 27 is twice 12 is 24 and 3 over; therefore I set down 2, carry 3 to the 9 and it is 39; then I say the 12's in 39 is 3 Times 12 is 36 and 3 over; therefore I set down 3 and carry 3 to 9 again and it is 39, as before; then I say again, the 12's in 39 is 3 Times 12 is 36 and 3 over; therefore I set down another 3 and carry 3 to 0 and it is 30; then I say, the 12's in 30 is twice 12 is 24 and 6 over; therefore I set down 2 and carry 6 to 8 and it is 68; the 12's in 68 is 5 Times 12 is 60 and 8 over; therefore I set down 5, and place 8 after it thus -8, and 'tis done.

To prove it, multiply back by 12 and take in the saying, 12 Times 5 is 60 and 8 is 68; 8 and I carry 6, &c. till you go thro' the whole.

Thus you see that Multiplication is an infallible Proof for Division. For if you multiply the Quotient by the Divisor, you will ever have the same Figures as in the Dividend; but still remember to take in the Remainder with the first Figure you begin to multiply by. There are 3 or 4 Ways to work Division; but we only shew you the Method which is most natural and practicable.

Of dividing by 2, 3, or more Figures.

Rule. First, See how many Times the Figures in the Divisor are contained in the same Number of Figures in the Dividend; and put that Figure in the Quotient. Secondly, Multiply the Divisor by the said Figure in the Quotient, and place it under those Figures in the Dividend that you began to work with, always observing, that the Product be not larger than the Figures in the Dividend; for if they are, you must rub out the Figure in the Quotient, and put one of a less Denomination. Thirdly, Subtract the Product from that Part of the Dividend it stands under, and to the Remainder bring down the next Figure in the Dividend, joining it to the last Figure of the Remainder. Then see how many Times the Divisor is contained in these Figures; then multiply the Divisor by the said Figure, then subtract again; and lastly, bring down the next Figure in the Dividend, as before; and thus proceed till you have no more Figures in the Dividend to bring down, and the Work is done.

Note 1. Every Time you subtract, observe whether the Remainder be larger than the Divisor; if it be, you must put a larger Figure in the Quotient.

Note 2. When you take a Figure down from the Dividend, and join it to the Remainder; and it is still less than the Divisor, then always put a Cypher in the Quotient, and bring down another Figure of the Dividend.

E X A M P L E.

Dividend  
Divisor 15) 19260 (1284 Quotient or Answer:

15  
—  
42  
30  
—  
126  
120  
—  
60  
60  
—  
0

Quotient 1284  
multiply by 15 Divisor

6420  
1284  
—

Product 19260 Dividend.

N

Rule

## Rule 2.

Note 1. When there are several Figures in the Divisor, it is easiest for a Learner to set how many Times the first Figure of the Divisor is contain'd in the first Figure of the Dividend, and place the Times in the Quotient; then multiply the whole Divisor by the Quotient Figure; and if the Product be more than the Figures which belong to the Dividend, you must make Trial of a less Figure, and put it in the Quotient.

Note 2. If the first Figure of the Divisor be larger than the first Figure of the Dividend; then take two Figures in the Dividend, and see how many Times the first Figure of the Divisor is contain'd in them.

Note 3. Remember that in trying how often the first Figure in the Divisor is contain'd in two Figures of the Dividend, it will sometimes appear to be 10 or 12 Times; but it never can be above 9 at most.

The above Example demonstrated.

First, I set the Dividend down on a Slate and make crooked Lines at the Ends of it, in the first of which I place the Divisor, thus, 15) 19260 ( and the other is to place the Quotient in.

Secondly, I enquire how many Times the first Figure of the Divisor is contained in the first Figure of the Dividend, and find it once; therefore I place 1 in the Quotient, and multiply the whole Divisor by it, and place the Product under the two first Figures of the Dividend, and subtract it therefrom, and it stands thus:

Second Work.

$$\begin{array}{r} 15 \overline{) 19260} \quad 1 \\ \underline{15} \phantom{0} \end{array}$$

Remains 42

Thirdly, To this Remainder 4 I bring down the next Figure, viz. 2, (always making a Dot under the Figure I bring down) and it is 42; then I ask how often the first Figure 1 in the Divisor is contained in 4, and it is 4 Times: But upon Trial I find 4 Times 15 to be 60. The

Therefore as 60 is more than 42, I must take a less Figure; I therefore make Trial of a 2, and find twice 15 to be 30, which I place under 42, and subtract it, and there remains 12, which stands thus:

**Third Work.**

15) 19260 (12

15

42

30

Remains 126

Fourthly, I now make a Dot under the 6, and bring it down by the Side of the 12, and it is 126; then I ask how many of the first Figures of the Divisor I can have in the two first Figures of the Divident, and find 12 Times: But according to Note 3, it never can be above 9; therefore I multiply 15 by 9, and it is 135: Now I can't take 135 out of 126, therefore 9 Times is too much, and I make Trial of a less Figure, viz. 8, which I put in the Quotient, and multiply 15 by it, which is 120, and place it under 126, and there remains 6, which stands thus:

**Fourth Work.**

15) 19260 (128

15

42

30

126

120

Remains 6

Lastly, I make a Dot under the Cypher (0) and bring it down by the Side of the 6 and it is 60; then I ask how many of the first Figure of the Divisor is contained in 0, the 1's in 6 is 6 Times; but on Trial I find it will be 4 Times; therefore I place 4 in the Quotient, and multiplying 15 by it, I find it to be 60; which I place

N 2

under

under the other 60, and there remains 0, and the Work is done, as under :

| Last Work.                                 |                      | Proof                                      |
|--------------------------------------------|----------------------|--------------------------------------------|
| Divisor 15)                                | 19260 (1284 Quotient |                                            |
| 15...                                      |                      | 1284 Quotient                              |
| <hr style="width: 50px; margin: 0 auto;"/> |                      | 15 Divisor                                 |
| 42                                         |                      | <hr style="width: 50px; margin: 0 auto;"/> |
| 30                                         |                      | 6420                                       |
| <hr style="width: 50px; margin: 0 auto;"/> |                      | 1284                                       |
| 126                                        |                      |                                            |
| 120                                        |                      |                                            |
| <hr style="width: 50px; margin: 0 auto;"/> |                      |                                            |
| 60                                         | Product 19260        | Dividend                                   |
| 60                                         |                      |                                            |
| <hr style="width: 50px; margin: 0 auto;"/> |                      |                                            |
| 0                                          |                      |                                            |

This is a plain Demonstration ; and the Reason of making Dots under every Figure you take down, is, that you may not mistake which Figure comes next in Course.

It is proved by multiplying the Quotient by the Divisor and afterwards adding the Remainder to it, or else taking it in as you multiply.

There is also a Method of proving Division by Addition which is this : Add the Remainder (if any) and all the lower Lines together in Order (that is every second Line as they stand, and you will find their Sum the same as the Dividend, if the Work be right.

### Of CONTRACTIONS.

When the Divisor consists of several Cyphers after Figure or Figures, then cut them all off, or separate them from the Figures with a Dash of the Pen or Pencil. Remember at the same Time to cut-off as many Cyphers of Figures in the Dividend. Then work the Sum as if such Cyphers never had been there, and you will have the same Answer.

Ex. 1.

$$\begin{array}{r} 1 \overline{) 000} \quad 9250 \overline{) 000} \\ \hline 9250 \text{ Anf.} \end{array}$$

Ex. 2.

$$\begin{array}{r} 4 \overline{) 00} \quad 5476 \overline{) 00} \\ \hline 1369 \text{ Anf.} \end{array}$$

Ex. 3.

$$\begin{array}{r} 12 \overline{) 00} \quad 5476 \overline{) 00} \\ \hline \text{Ans. } 4573 \text{ - } 6 \end{array}$$



Here I cut off all the Cyphers in the Divisor, and an equal Number in the Dividend, and divide only by single Figures, and if any Thing remains, I set it after it; as Ex. 3. 6 remains, which I set after the Answer, thus -6.

SECTION II.

DIVISION of Parts.

DIVISION of Parts is the dividing by any two single Figures in their Parts; which 2 Figures multiplied together will be equal to the Divisor. You may remember in Multiplication, when any Number was given the Table, you found two such Figures as, when multiplied together, will make that Number. So here also you do the same, only with this Difference, that you here divide by them instead of multiplying. Thus, suppose I am to divide by 24, by 32, by 48, or by 72, I first divide by 3, then by 8; for 3 Times 8 is 24, and the last Quotient is the Answer. So if I divide by 48; I divide the Number first by 8, and then that Quotient I divide by 6, and have the proper Answer, &c. It is purely the Reverse Multiplication.

EXAMPLE 1.

Divide 16488 by 24. Here 6 Times 4 is 24.

First by 6)  $\begin{array}{r} 2748 \\ \hline \end{array}$  Quotient by 6.

Then by 4)  $\begin{array}{r} 617 \\ \hline \end{array}$  Quotient by 24.

EXAMPLE 2.

Divide 126216 by 72. 6 Times 12 is 72.

First by 6)  $\begin{array}{r} 21036 \\ \hline \end{array}$  Quotient by 6.

Then by 12)  $\begin{array}{r} 1753 \\ \hline \end{array}$  Quotient by 72.

As in Multiplication Money is increased so many Times, Division it is decreased so many Times, according to the given

given Number. We shall take an Example in Multiplication, and prove it by Division.

If 1 Ell cost £ 1 — 3 — 8 What cost 40 Ells?

$$\begin{array}{r}
 8 \\
 5 \\
 \hline
 40
 \end{array}
 \qquad
 \begin{array}{r}
 9 - 9 - 4 \\
 \hline
 47 - 6 - 8 \text{ Anf.}
 \end{array}$$

**PROOF by DIVISION.**

If 40 Ells cost 47 — 6 — 8, What cost 1 Ell?

Here I divide back by the same Figures I multiplied by, carrying the Pounds to the Shillings, and the Remainder of the Shillings to the Pence, doing by Twenties and by Twelves, as in Addition.

$$\begin{array}{r}
 \text{by } 5) \text{ £ } 47 - 6 - 8 \\
 \hline
 \text{Then by } 8) \quad 9 - 9 - 4 \text{ Price of } 8 \\
 \hline
 \quad \quad \quad 1 - 3 - 8 \text{ Price of one.}
 \end{array}$$

Here I divide first by 5, saying, the 5's in 47 is 9 Times 5 and 2 over, which is 21. This 21. I carry to the 6's and it is 46 Shillings: Then I say, the 5's in 46 is 9 Times is 45 and 1 over, that is 1 Shilling, which I carry to the 8d. and it is 1 s. 8d. or 20d. then I say the 5's in 20 is 4 pence. Now I divide this £. 9 - 9 - 4 by 8, saying the 8's in 9 is once and 1 l. over, which I carry to the 9s. and it is 11. 9s. or 29 Shillings; then I say, the 8's in 29 is 3 Times 8 is 24, and 5 Shillings over; which 5 s. I carry to the Pence, and it is 5s. 4 d. or 64 Pence then I say the 8's in 64 is 8 Times. So is the Price of Ell £. 1 - 3 - 8; as is apparent also by the Work Multiplication.

So that if you understand the Nature of multiplying a Sum by any Figure, you may as readily divide it back again



A N

## INTRODUCTION to GEOMETRY.

GEOMETRY originally signifies the Art of measuring the Earth, or any Distances or Dimensions on or within it. But is now used for the Science of Quantity, Extension, or Magnitude, abstractedly considered, without Regard to Matter.

It is usually divided into speculative and practical. The former contemplates and treats of the Properties of continued Quantity abstractedly. The latter applies these speculations and Theorems to Use and Practice, for the Benefit and Advantage of Mankind.

This Science is on all Hands agreed to have been first found out in Egypt, and to have owed its Rise to the setting out and measuring of their Lands, the Bounds of which were annually disturbed by the Overflowing of the Nile. This Regulation is originally ascribed to the Wisdom of the great Sesostris. How far that People improved this Science, is not very certain. But their Skill therein seems not to have been very profound, nor to have extended to all Geometrical Quantities and subtle Theories, as that of the Moderns. The utmost they knew was, probably, no more than plain Measuring, and such Rules were of common Use in Life. For Pythagoras, who travelled into Egypt for the Sake of their Learning, after his Return Home offered an Hecatomb, on his finding out the Proportion of the longest Side of a right-angled Triangle to the other two. And Thales, who also learned Geometry in Egypt, sacrificed an Ox to the Gods, for Joy that he had hit on a Method of inscribing a rectangled Triangle within a Circle. Both which Inventions they could not have had from the Egyptians; unless we should say that the Egyptians did not teach them all they knew, or that these two Philosophers unjustly arrogated to themselves what they had learned of their Masters. Now, if these more simple, tho' noble, Propositions were not then to be found in the Egyptian Geometry, much less can it be supposed

to

to have contained those more abstruse Theorems, and analytical Methods, which were afterwards known, and for which we are indebted to the Greeks, who built so fine a Superstructure on the old Egyptian Foundation.

The Usefulness of this Science is generally confessed without a tolerable Knowledge of which the Astronomer, the Geographer, and Architect, would find themselves greatly embarrassed and deficient. In the Conduct of military Operations it is absolutely necessary. It marks the Situation, Form, and Strength of Things and Places which are seen at a Distance, and can be approached only by the Eye. Therefore those who are inclined to serve their Country in this Capacity, must apply themselves to the Study of Geometry. For it contrives and executes the Structure of Machines for the Demolition of Towns and Castles: Again, it draws out the Foss and raises the Rampart, points the Bastion, and erects the Wall; builds Ships of War and describes the Course and fixes the Descent of the destructive Bomb and Ball; rendering the judicious Officer much more useful to his Country by the Display of his acquired Knowledge, than it is possible for him to be by the Exertion of his utmost Intrepidity. The Application of it to Mechanics has given Birth to Discoveries of the greatest Importance. Even Music is highly indebted to it; its Notes being expressed by a proper Division of Chords, and so judged of by the Eye with more Precision than the Ear itself. In fine, every Science, in which Quantity and Lines are concerned, must acknowledge its Obligations to, while it receives the most liberal Improvements from its Connection with, Geometry.

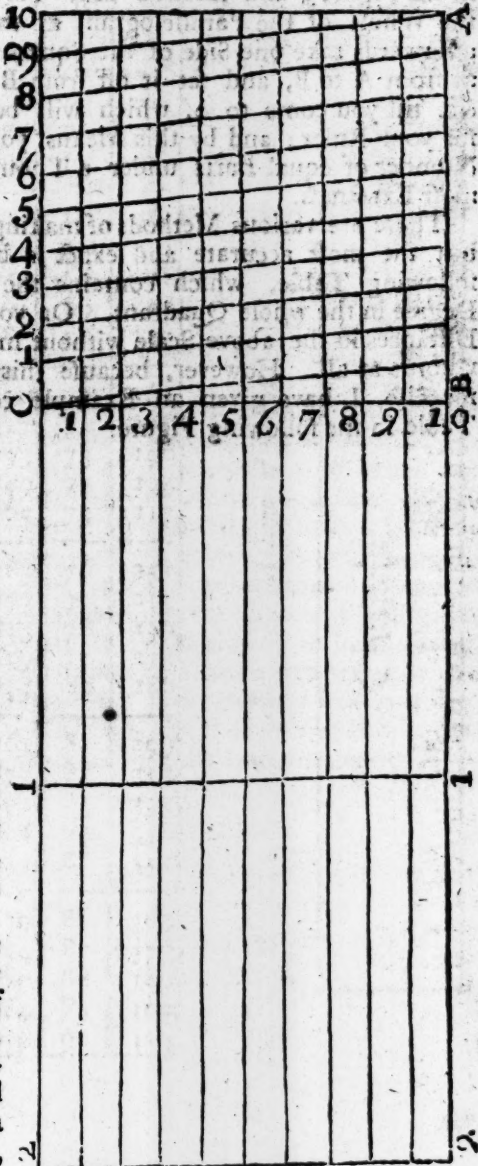
PRACTICAL GEOMETRY.

Of making a SCALE and a LINE of CHORDS.

1 2 3 4 5 6 7 8 9 10

Before we proceed to Practice, it is necessary to take Notice, that a Learner should be provided with Compasses, Scales, Dividers, or other Instruments proper for the dividing of Lines, and the Circumference of a Circle; otherwise these Operations will be very tedious and Labour endless; especially those who live near large Towns where Mathematical Instruments are sold, may easily provide themselves with all things necessary; but as there are some who live in places where these things are procured with Difficulty, I will shew how that effect may be supplied by their own Labour.

You may make a Parallelogram or long Square of any Size you please, in the Figure annexed. At the End of which mark off a part exactly square,





and divide each Side into ten equal Parts, drawing Diagonal Lines from one Side to the other, as you see done in the Figure; and likewise draw Parallel Lines through the Whole of the Parallelogram at the same Distances afterwards take one Side of the Square in your Compasses as from A to B, and set it off from B to 1, from 1 to 2 &c. till you come to 9, which will be a proper Length for your Ruler; and by this Means you may take off any Number of equal Parts under a Thousand, with the most Exactness.

There are various Methods of making a Line of Chords but the most accurate and exact is by the Help of the following Table, which contains the Distance of every Degree in the whole Quadrant. Or you may take off the Distances in the above Scale without making any Line of Chords at all. However, because this Line is the readiest for Use, I have given an Example conformable to the Table in the following Figure.

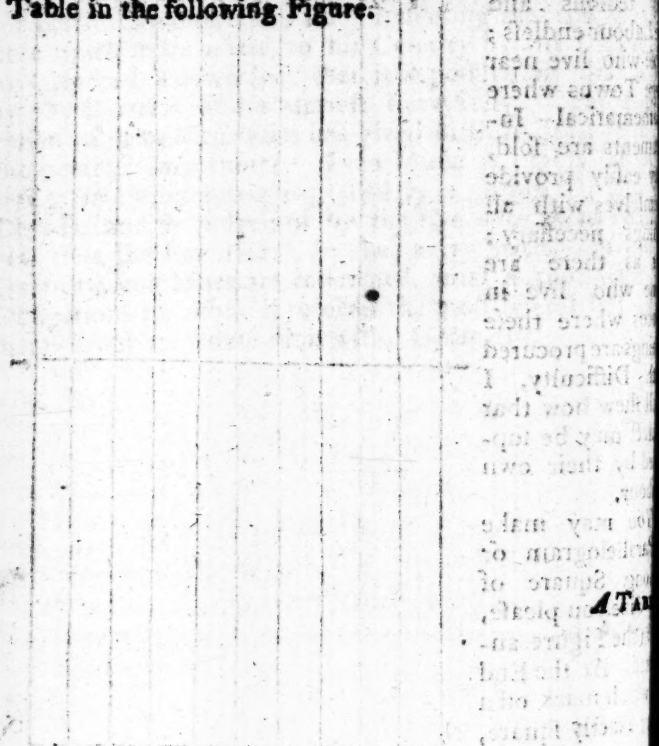
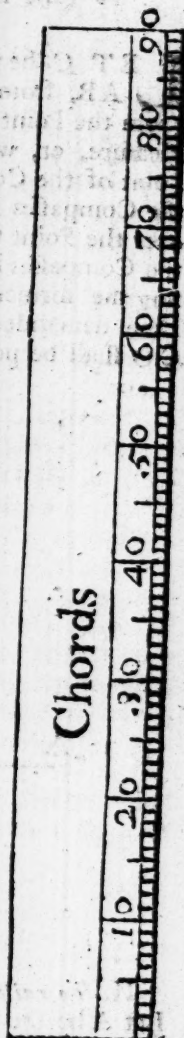


TABLE serving to divide a Line  
of CHORDS.

| g. Cho. | Deg. | Cho. | Deg. | Cho. |
|---------|------|------|------|------|
| 017     | 31   | 534  | 61   | 1015 |
| 035     | 32   | 551  | 62   | 1030 |
| 052     | 33   | 568  | 63   | 1045 |
| 070     | 34   | 585  | 64   | 1060 |
| 087     | 35   | 601  | 65   | 1074 |
| 105     | 36   | 618  | 66   | 1089 |
| 122     | 37   | 635  | 67   | 1104 |
| 139     | 38   | 651  | 68   | 1118 |
| 157     | 39   | 668  | 69   | 1132 |
| 174     | 40   | 684  | 70   | 1147 |
| 192     | 41   | 700  | 71   | 1161 |
| 209     | 42   | 717  | 72   | 1176 |
| 226     | 43   | 733  | 73   | 1190 |
| 244     | 44   | 749  | 74   | 1204 |
| 261     | 45   | 765  | 75   | 1217 |
| 278     | 46   | 781  | 76   | 1231 |
| 296     | 47   | 797  | 77   | 1245 |
| 313     | 48   | 813  | 78   | 1259 |
| 330     | 49   | 829  | 79   | 1273 |
| 347     | 50   | 845  | 80   | 1286 |
| 364     | 51   | 861  | 81   | 1299 |
| 382     | 52   | 876  | 82   | 1312 |
| 398     | 53   | 892  | 83   | 1325 |
| 416     | 54   | 908  | 84   | 1338 |
| 432     | 55   | 923  | 85   | 1351 |
| 450     | 56   | 939  | 86   | 1364 |
| 466     | 57   | 954  | 87   | 1377 |
| 484     | 58   | 970  | 88   | 1389 |
| 501     | 59   | 984  | 89   | 1402 |
| 518     | 60   | 1000 | 90   | 1414 |

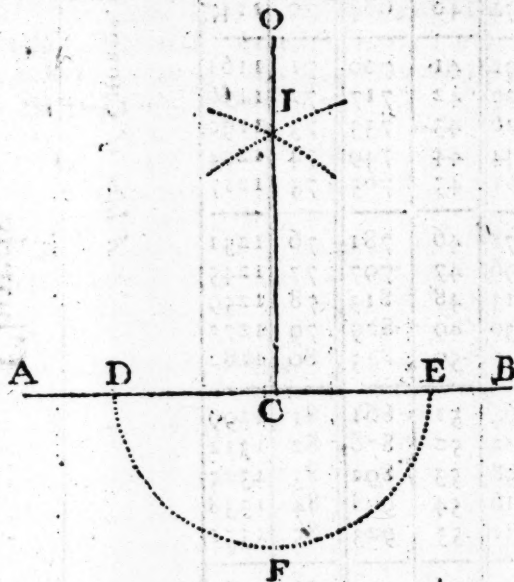
A Line of CHORDS.



*Of drawing LINES and PLAIN FIGURES.*

I. *To raise a Perpendicular from a Point given in a straight Line.*

**L**ET C be the Point given in the Midst of the Line AB, from which a Perpendicular is to be raised. From the Point given C, draw the Semi-circle DEF at Pleasure, or, which is as well, make two Marks with the Point of the Compasses in D and E; then set one Foot of the Compasses E, and with the other make a small Arch over the Point C, as in the Figure; then set one Foot of the Compasses in D, and make another small Arch crossing the former at I. From the Point C draw the right Line demanded CO through the Section I. This Line CO shall be perpendicular to the given Line AB.

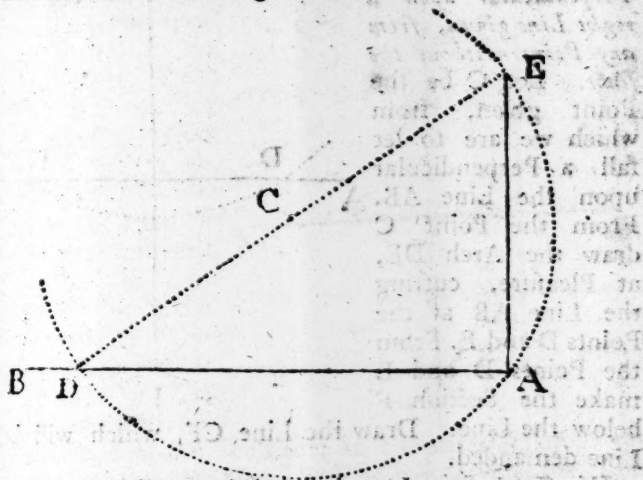


II. *To raise a Perpendicular at the End of a given Line.* Let A be the End of the Line AB, upon which a Perpendicular is to be raised. Set the Point above the Line at Pleasure, suppose at C. From this Point C and the Interval CA, draw the Portion of a Circle EAD. Draw the right Line DCE by the Points D and C. Then draw

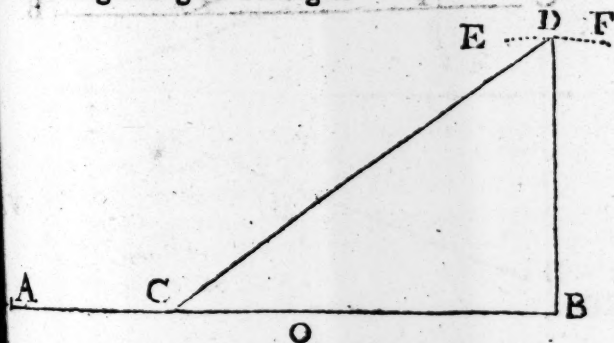
# *Practical Geometry.*

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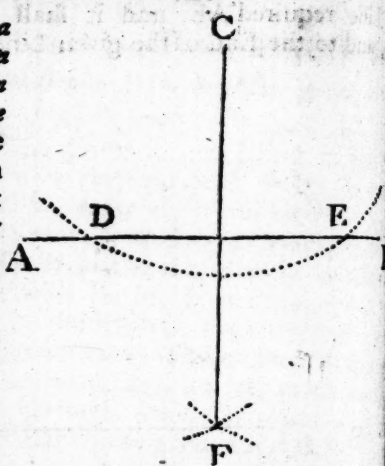
Line required AE, and it shall be perpendicular to  
and to the End of the given Line.



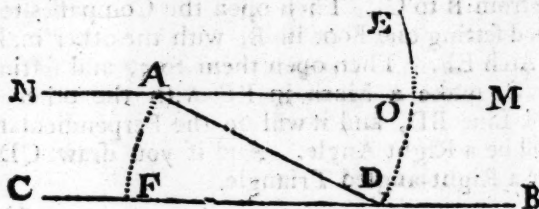
But there is a more easy Way of raising a Perpendicular  
the End of a Line, or, which is the same Thing, a  
Right Angle; by the Help of the Numbers 3, 4, and 5.  
That is, open your Compasses on a Line of equal Parts to  
4, and 5, and make a Triangle with these Numbers,  
you will have a Perpendicular. Suppose the Line was  
BD, take 4 Parts from a Line of equal Parts, and set that  
Distance from B to C. Then open the Compasses to three  
Parts, and setting one Foot in B, with the other make the  
Arc EF. Then open them to 5, and setting one  
Foot in C, make a Mark in EF with the other at D.  
Draw the Line BD, and it will be the Perpendicular, and  
D will be a Right Angle. And if you draw CD, and  
you have a Right-angled Triangle.



III. To let fall a Perpendicular upon a right Line given, from any Point without the same. Let C be the Point given, from which we are to let fall a Perpendicular upon the Line AB. From the Point C draw the Arch DE, at Pleasure, cutting the Line AB at the Points D and E. From the Points D and E make the Section F below the Line. Draw the Line CF, which will be the Line demanded.

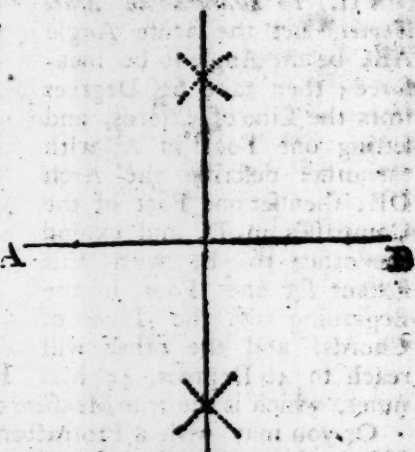


IV. To draw a Line that shall be parallel to another right Line at a given Distance. Let A be the Point, thro' which a Line is to be drawn parallel to the Line CB. Draw the oblique Line AD at Pleasure. From the Point A draw the Arch DE; and from the Point D, draw the Arch AF. Then make the Arch DO equal to the Arch AF, and draw the Line required NM, by the Points A and O.



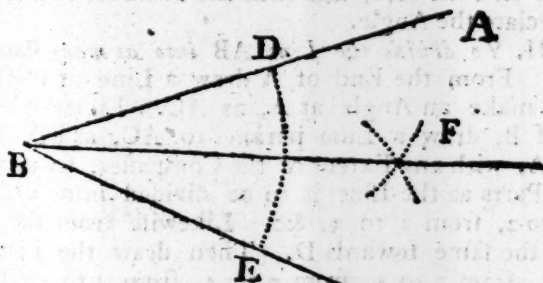


V. To divide a right line given into two equal parts. Let AB be the right Line given. From the End A, opening the Compasses wider than half the Line, draw the Arches above and below the Line, as the Figure annexed.

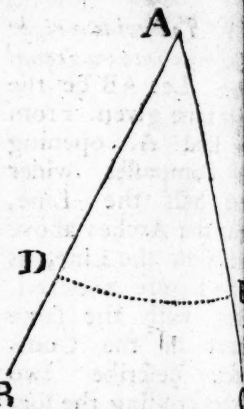


Then, with the same extent of the Compasses, describe two Arches crossing the former. Draw a Line from the Intersection of the two Arches above the Line, to the Intersection of the two Arches below the Line, and it will divide the Line AB into two equal Parts.

VI. To divide a given right-lined Angle into two equal parts. Let ABC be the Angle given. Set one Foot of the Compasses in the Angular Point B, and extend them any convenient Distance to draw the Arch DE, with the same or any other Extent above half the Distance, set one Foot in D and draw the Arch F. Then keeping the Compasses at the same Extent, set one Foot in E and describe the Arch F. A Line drawn from the Angular Point, thro' the Intersection of the Arches, will divide the Angle A into two equal Parts.

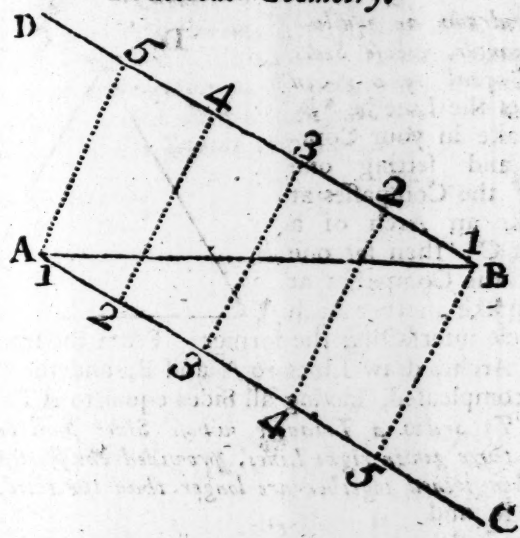


VII. *To measure an acute Angle.* Let the acute Angle ABC be the Angle to be measured; then take 60 Degrees from the Line of Chords, and setting one Foot in A, with the other describe the Arch DE; then set one Foot of the Compasses in D, and extend the other to E, with this Extent set one Foot in the Beginning of the Line of Chords, and the other will reach to 40 Degrees, 45 Minutes, which is the true Measure of the Angle ABC.

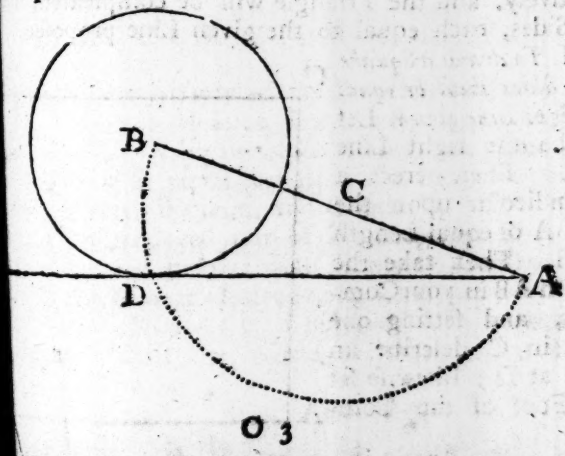


Or you may with a Protractor, an Instrument of great Use in Surveying, lay the Center on the Point A, and its Diameter on one of the Lines of the Angle, and the Number of Degrees intercepted between the two Sides shall be the Measure of the Angle given. When the Instrument is not at hand, you may make Use of a Sector by making AD or AE the Radius, and then you may take the Distance between D and A in your Compasses, and opening the Sector till one Point of the Compass being placed upon 60 of the Line of Chords, shall reach to 60 on the other Side of the Sector in the same Line. This done, let the Sector remain at this Opening, and then take the Distance between D and E in your Compasses, and place them on the same Lines with the 60 Degree on each Side, and then the Number of that Degree will declare the Angle.

VIII. *To divide the Line AB into as many Parts as please.* From the End of A draw a Line at Pleasure, as to make an Angle at A, as AC. Likewise from the End of B, draw a Line parallel to AC, as BD. On Line A, with any Extent of the Compasses, set off as many equal Parts as the Line is to be divided into, as from 1 to 2, from 2 to 3, &c. Likewise from the End of B do the same towards D. Then draw the Lines from 1 to 5, from 2 to 4, from 3 to 3, from 4 to 2, and from 5 to 1. Then will the Line AB be divided into 4 equal Parts.

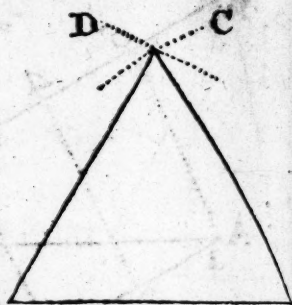


X. From the Point A out of a Circle to draw a Tangent to the Circle, or a Line that shall touch the Circumference without intersecting it. From the Point A draw a Line to the Center B of the Circle, which Line is called the Secant. Divide this Line into two equal Parts in C. Then take one Foot of the Compasses in the Point C, and with the same Extent CA or CB, draw the Semi-Circle ADB, cutting the Circumference in D. Then from the Point given draw a Line through the Intersection at D. This Line shall be the Tangent, or the Line touching the Circle required.



O 3

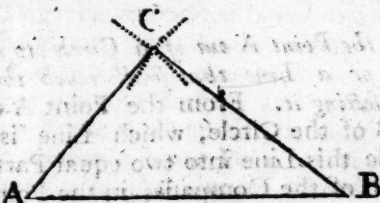
X. To draw an equilateral Triangle, whose Sides shall be equal to a given Line. Let the Line be AB, which take in your Compasses, and setting one Point of the Compasses at B, make an Arch of a Circle at C; then set one Point of the Compasses at A, and make another Arch



of a Circle intersecting the former From the Intersection of these Arches draw Lines to A and B, and the Triangle will be completed, having all Sides equal to A B.

XI. To draw a Triangle whose Sides shall be equal to three given right Lines, provided the shortest two when joined together are longer than the third.

Let A, B, and C be the Lines given. Draw the Line AB equal to C. Then take B in your Compasses, and setting one Foot in A



B make an Arch at C, with the other End. This done take A in the same Manner, and setting one Foot in A intersect the former Arch at C with another Arch. Last draw the Lines AC and BC to the Intersection of the Arches respectively, and the Triangle will be completed, having three Sides, each equal to the given Line proposed.

XII. To draw a Square whose Sides shall be equal to a right Line given. Let A B be the right Line given. Then erect a Perpendicular upon the Point A of equal Length to AB. Then take the Length AB in your Compasses, and setting one Foot in C describe an Arch at D; likewise set one Foot of the Com-



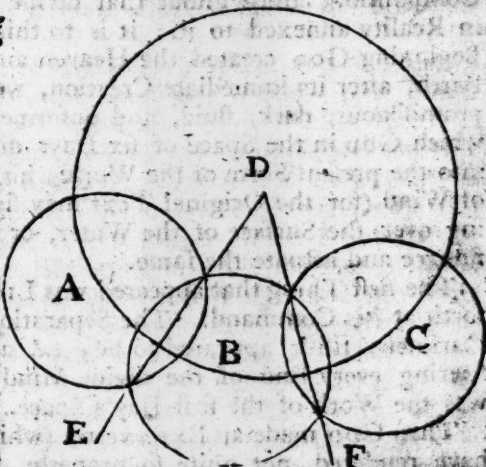
## Of the Creation of the World.

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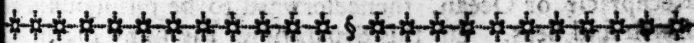
passes in B, and describe another Arch at AD, which shall intersect the former. This done, from the Point C draw a Line to the Intersection at D, and from the Point B draw another Line to the Intersection at D. And the Square ABCD shall be the Square required.

### XIII. To describe a Circumference thro' three Points given.

Let A, B, and C be the three Points given, thro' which the Circumference of a Circle is to be drawn. On the Point A describe a Circle, and likewise with the same Opening of the Compasses, on the other Points B and C intersecting each



other, as you see in the Figure. Draw the Lines ED and FD through the Intersections of the Circles, and where they meet, as at D, place one Foot of the Compasses, and with the other reaching to A, or B, or C, describe the Circumference required.



## Of the CREATION of the WORLD.

THE several Parts of the Creation evidently prove the Existence of some first Cause, which is GOD; as the beautiful Order in which Things are seen, and their Subservience to particular Ends and Purposes proclaim his infinite Power, Wisdom, and Goodness. That any Thing should be produced out of Nothing, or Something *be*, which *was not* before; can imply no Contradiction. It is only the *Manner* of producing Existence; which is difficult to be conceived by a Being of such limited Faculties as Man. That the World therefore had a Beginning, being



being absolutely produced by GOD, is a rational Proposition. This indeed is the only authentic and genuine Account of the Creation, which has been transmitted to us by Moses, and carries with it all the Marks of Truth and Probability; even though it be regarded only as an human Composition, and without that divine Authority which is in Reality annexed to it. It is to this Purpose: In the Beginning GOD created the Heaven and the Earth. The Earth, after its immediate Creation, was for some Time promiscuous, dark, fluid, and unformed Mass of Matter, which GOD in the Space of six Days disposed and reduced into the present Form of the World; his Spirit, or a Breeze of Wind (for the Original Text may signify either) moving over the Surface of the Water, or fluid Matter to influence and actuate the same.

The first Thing that appeared was LIGHT, which sprung forth at his Command. The Separation of this from the Darkness, till it appeared to be *good*, and capable of answering every End of the divine Mind in its Production, was the Work of the first Day's Space.

Then GOD made an EXPANSION (which our Translators have rendered, not quite so properly, the *Firmament*) in the Midst of the Waters, to divide the Waters above from the Waters below. This Expansion Moses calls Heaven: The Formation of which took up the second Day's Space.

Next, GOD caused the Earth to appear out of the Waters, and these last to be gathered together chiefly into one great Receptacle or Ocean, thenceforward to be distinguished as Earth and Seas. On this Separation, the slimy Earth, at his Command, shewed evident Marks of its Fertility; all Sorts of Plants, Herbs, and Trees began to germinate, many of which, for the Sustenance of the intended Inhabitants, must have arisen wonderfully in full Proportion and Maturity; bearing their several Seeds and Fruits, according to their various Kinds. And this, as had the Work of the past Day's Space, received also the divine Approbation.

During the Space of a fourth Day, GOD commanded, and the Luminaries appeared in the Firmament of Heaven, to be a Distinction between Day and Night and a safe Division of their respective Portions; as well as to serve for the Regulation of Signs and Seasons, and the exact

exact Numeration of Days and Years, and to give Light upon the Earth. To this End the two great Lights, the Sun and Moon, were particularly made; to the brighter and larger of which was given the Dominion of the Day, which was to issue from it, and to the smaller and less lucid Orb, together with the Stars, was given the Dominion of the Night. And, upon a View of all, ineffable Wisdom pronounced them good.

Thus was formed in four a Day's Space, and in beautiful Order and Perfection, the inanimate World. But, as yet there were no living Creatures to enjoy the Benefit of it. Therefore in the first Place God commanded, and the Waters, or the soft and liquid Ooze, produced abundantly all Kinds of living Creatures, (Man and Beast excepted) with their several Species. The Fishes of the Sea began to move, and the great Leviathan to drive the Floods before him. The Fowls spread their soft Wings, and mounting above the Earth, flew with Rapidity along the wide Expansion. The Almighty saw with Complacency this living Production, bade them to multiply upon the Earth, and fill the Waters in the Seas, and declared them fruitful by his blessing. This was the Business of the fifth Day. And as the Original of Fish and Volatiles was from the same Element, so there is supposed to be some Congruity in their Nature, being both oviparous, or bringing forth their Young in the Egg, and their Motions of swimming and flying nearly resembling each other.

On the Beginning of the sixth Day God made, of the harder Particles of Earth, and of firmer Texture, every Beast of the Earth after his Kind, and all Cattle after their Kind, and every Reptile or creeping Thing after his Kind.

The Manner of the original Formation of Plants and Animals, in which the Wisdom of the Creator principally appears, has never been accounted for with any tolerable Success: Matter and the Laws of Motion having nothing at all to do in these Things, whatever they have in the inanimate Part of the World. For the Circulation of the Fluids, both in Plants and Animals, can be no Property of inert or sluggish Matter, and is performed in a Manner contrary to all the known Laws of Motion. How ridiculous and groundless those Notions are, which suppose them pro-

produced by the Heat and Influence of the Sun, appears from the late Discovery made in Philosophy, that there is no such Thing as equivocal or spontaneous Generation in any the meanest Animal or Plant. For it appears that all are produced from their respective Seeds, lodged in some proper Repository, till due Time shall call it into Life and Action. The Sun, and Earth, and Water, and all the Powers of Nature in Conjunction, can do nothing towards the producing of any Thing endued with even vegetative Life. It will follow that God himself formed both Plants and Animals, making Use of the Earth and Water, as the Matter only, whereof he constituted their Parts. But whether these first vegetative and sensitive Creatures were created in their Seeds only (which contain the Plants and Animals in little) and dispersed over the Surface of the Land and Water, which had Power given them to hatch and bring them forth, or whether they were created in full Maturity and Perfection, has been made a Question. It has been thought by some, that God at first created only two of each Species of Animals, from which the rest were generated. To support this Opinion, they observe, that there was but one Man and one Woman created; and at the Deluge, only two of each Kind (of unclean Beasts) were preserved in the Ark. But it seems more agreeable to the Letter of Scripture, that a great Number of every Kind were formed at first. The aquatic Creatures and Fowls are said to have been *brought forth abundantly*; and Plants having no Power of moving from Place to Place, must have been created dispersedly over all the Earth, and were immediately necessary. Another Question has been started, viz. Whether all Animals that have been, or shall ever be, were actually created by God at first; or whether he has given to each Kind of Animal such a Power of Generation, as to prepare Matter, and produce new Individuals of their own Bodies? And it seems to be the most reasonable Opinion, that God did himself at first actually create all the Animals that ever were, or ever will be; and that there is no Production of new ones. For what would such a Production be but a Creation of such Individuals? And what did God at the first Creation more than, if this be true, we see every Day done? That is, produce a new Animal out of Matter which itself prepares it. All the Dis-

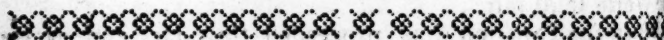
ence is, that God does that in an Instant, which the Creature must take Time to do. Besides the Parent Animal cannot be the Agent or Efficient in the Generation, forming and nourishing of the Fœtus; because that is Work of Art and Reason, which brute Creatures are not endued with. Nor indeed does Man himself understand any Thing of the Process of Generation in himself. Again, it is most probable, if not certain, that most Animals have in them, from the Beginning, the Seeds or Eggs of all the Young they shall afterwards bring forth; when these are spent and exhausted, the Creature becomes barren. The Females of all four-footed Animals, which bring forth their Young alive, are brought forth with their *Testes* and *Ovaria*. And all Birds, formed with their Ovary, or Egg Cluster, contain the Seeds of all the Eggs that they shall ever lay. Now, had the Creature a Power of producing new ones, what need was there, that there should be so many at first formed in them? Let us suppose, God did at first create two Animals, a Male and a Female. The Female must have been created with its Ovaries, which, as we have said, contain so many Seeds, or Eggs, as the Creature should ever bring forth Young. So it is clear, that not only the first Pair, but the first Generation of Animals, were actually created. Again, this Generation, from the first Appearance, had, each of the Females, its Ovary containing also the Seeds of its future Offspring. So that this second Generation was also created in the first. The same may be demonstrated of the third and fourth, and so on, of all the Generations that shall be, as long as the World shall last.

When the Creation had proceeded thus far, and every Thing that could be subservient to Man, or advance his Felicity, was completed: He, who was to be the Lord of all, and for whose Sake the whole was framed, was brought into the World, being created in a more solemn manner, after a Consultation, as it were, of the Holy Trinity; *Let us make Man in our Image, after our Likeness*. On the occasion of this Passage, the Jewish Doctors tell the following Story: That as Moses was writing his Book by God's Appointment, and these Words came to be dictated, he made some Difficulty to set them down; crying out, *O Lord, would'st thou lead Men into Error, and make them doubt*

of

of the Doctrine of the Unity? On which God answers I command thee to write; and if any will err, let them err. And Philo the Jew says, the true Reason of this Expression is known to God only.

Man then was, by the divine Power, created on the first Day, after the terrestrial Animals had been produced. His Body was formed of Red Earth, whence he had the Name of Adam, and his Soul was immediately infused into him by his Creator; in which better and immortal Part more evidently consisted that Image or Resemblance of God wherein he is said to have been made. The Woman also was formed on the same Day out of the Side of the Man who had been cast into a deep Sleep for that End. From what Adam said on his first Sight of her, that she was *Bone of his Bone and Flesh of his Flesh*, he seems well to have known whence she was taken; whether he was sensible of the past Operation, or had it revealed to him, as is probable, in a Vision while he slept. Thus were the first Pair created in an adult and perfect State, with the utmost Symmetry of Parts, and capable of the full Exercise of the natural Powers and Faculties both of Body and Mind. The Almighty pronounced a Blessing upon them and gave them Dominion over every living Creature that should be seen on Earth, or Sea, or Air. Every Herb bearing Seed, and every Tree yielding Fruit was appointed for their Food. (This being done, the sovereign Creator reviewed his whole Work that he had made, and behold it was very good. And the Evening and the Morning were the sixth Day.



#### Of the Books of the Old Testament, &c.

THE Pentateuch, or five first Books of the Old Testament, the first of which begins with the History of the Creation, were written by Moses, the Son of Amram who was the Grandson of Levi. He conducted the Children of Israel out of Egypt, gave them the Law by God's Appointment in the Wilderness, and led them to the Frontiers of the Land of Canaan, their promised Inheritance, where he died at the Age of an hundred and twenty Years.



These five Books contain the History of the World, and more particularly of the Jewish Nation, from the Formation of Adam to his own Death. But the Account of his Death in the last Chapter of Deuteronomy is supposed with Reason to have been added by Eleazer, the Son of Aaron. That he was divinely inspired is not to be doubted, considering the Nature of his Commission to Pharaoh, and the Wonders which he exhibited before him, his frequent Intercourse with the Deity, and the Miracles wrought by him in the Wilderness during a Course of forty Years. Add, that the Continuance of a most numerous People, dispersed over the Face of the whole Earth, still professing Obedience to the Law which was given by him, is not only a Proof of the divine Authority on which it was founded, but of the Old Testament in general. Yet he could not want the ordinary Means of Information, even with respect to Things transacted before the Flood, as well as after, since by Reason of the long Lives of the Patriarchs, these Things were easily conveyed down by Tradition. For Noah was born but an hundred and twenty-six Years after Adam's Death; and Methuselah lived two hundred and forty-three Years Cotemporary with Adam, and almost six hundred Years in the Time of Noah. So that he alone might easily communicate to the one that Knowledge which he had received from the other.

After the Flood, Noah died but two Years before Abraham was born, whose Father, Terah, lived an hundred and twenty-eight Years Cotemporary with Noah, and seven-fifty with Abraham. So that these three, Terah, Noah, and Methuselah might, and unquestionably did, convey down the ancient Knowledge to the Time of Abraham. Now careful Abraham was to convey it to his Posterity, we are repeatedly informed. Kohath, the Grandfather of Moses, was grown to Maturity or Manhood twenty-one Years before the Death of Isaac; so that by Isaac, the Son of Abraham, and Amram, the Son of Kohath and the Father of Moses, it was with equal Ease imparted to Moses himself. His Information was therefore to be depended on, and the Stream of ancient Learning, so near its Fountain, must needs flow pure. Nor can we doubt of his Capacity for the further Transmission of it in Writing, who

was educated in the Court of Pharaoh, and versed in all the Wisdom of the Egyptians.

He was succeeded in the Government of the Israelites by Joshua, who wrote the Book which is called by his Name. It particularizes the Expulsion of the Inhabitants and the Settlement of his own Nation in the Land of Canaan under his Conduct. He had before displayed his military Talents under Moses, and had visited the Country as a Spy. While ten of his Companions discouraged the People with a terrifying Account of the Number and Strength of their Enemies; he and Caleb only made a favourable Report, and in Consequence were at last permitted to enter that Land, from which the Israelites in general of more than twenty Years of Age were by the Wrath of God excluded. He governed the Commonwealth for twenty-five Years, at the End of which he convened the People and gave them a solemn Exhortation to obey God, and renewed their Covenant with him by Oath, and then died in the hundred and tenth Year of his Age.

The Book of Judges is supposed to have been written by the Prophet Samuel. It contains a further Account of the Israelitish Affairs to the Death of Samson, during the Space of three hundred and twenty-seven Years.

In the Time of the Judges, and probably under the Judicature of Shamgar, about one hundred and twenty Years after Joshua, lived Boaz and Ruth, concerning whom the Book was written, which bears the Name of the latter. It was penned by one of the Prophets in the Time of David, whose Genealogy through these two Persons it records.

The two Books of Samuel were written by himself in Part, and comprize the History of the Jews from his own Birth under the Judicature of Eli the High Priest to the Institution of the regal Government in Saul, and its firm Establishment by the Appointment of David to the Succession. This takes in ninety-eight Years. What was added after the Death of Samuel from the End of the twenty-fourth Chapter of the first Book, is supposed to have been done by the Prophets Nathan and Gad. This comprehends a Term of sixty and two Years.

The first Book of the Kings begins with the last Year of David's Reign, and the second ends with the thirty-seventh of Jehonkin's Captivity; comprehending four hundred and

ity-four Years. These form but one Book in the original Hebrew, though it has since been divided on Account of its Size. Those which follow by the Title of Chronicles were also one Book originally, though since divided for the same Reason. These are a Diary or Book of Annals, consisting chiefly of Things omitted in the former Account of the Kings; with exact Genealogical Tables from Adam to Saul and David. These Historical Books are judged to have been written by the Prophet Ezra, after the Babylonish Captivity, according to the constant Report of the Jewish Writers.

The Book of Ezra was the Work of the Prophet whose Name it bears. It recites the Restoration of Jerusalem and the Temple, at the End of the Babylonish Captivity, in consequence of the famous Decree of Cyrus the Great. This Prophet collected, transcribed, digested into Order, and divided into Portions and Lectures, the several Books which compose the Hebrew Canon. And wheresoever in scripture you meet with any Thing as *remaining unto this day*, that Expression is thought to have been inserted by the inspired Ezra.

The Prophet Nehemiah wrote the Book entitled from him, which contains an Account of his Journey from Babylon to Jerusalem, for rebuilding the Wall of the City, and the Reformation of its Inhabitants, which he zealously effected. This Transaction fell out seventy-two years after the March of Ezra and the Decree of Cyrus. Yet these two had been Contemporaries and Members together of the Great Synagogue which published the Canon of Holy Scripture. For Nehemiah lived to a great Age, and his Book in the Hebrew is usually annexed to that of Ezra.

The Book of Esther records the Deliverance of the Jews from the designing Malice of Haman, the Favourite of the Persian King. This Piece was ever in great Repute with the Jews, and was written, as most imagine, by Mordecai himself. Because in the 9th Chap, and the 20th Verse, it is said, that *Mordecai wrote these Things*. Moses is thought to have written the Book of Job, during his Retirement in Midian, for a Comfort to his afflicted Brethren. The Additions, which have been preserved by Theodotion, in his Version of this Book, say, that

Job dwelt upon the Confines of Idumea and Arabia; his first Name was Jobab; that he married an Arabian, whom he had a son named Elnon. He was the Son of Zarah, and the fifth in Descent from Abraham by Eliezer and reigned in Idumea. It is possible enough for Job to have seen an End of all his Sufferings, before Moses left the Land of Midian; in which Case he, justly supposed to be the most ancient Writer, has been likewise thought to be the Author of his History by the Majority of learned Men. The three or four last Verses of the Book were probably added afterwards by some inspired Person, to complete the History, as Joshua or Eleazer added the Account of Moses Death and Burial at the End of Deuteronomy.

The Prophet Ezra collected and revised the Psalms and digested them in the same Order in which we have them now; as is generally believed by Jews and Christians. His self was probably the Author of those which were manifestly composed, during the Captivity and after the Return from it. These are fifteen in Number, and begin with the hundred and twentieth, ending with the hundred and thirtieth fourth. They are styled *Gradual*, or *Songs of Degrees*.

Proverbs, Ecclesiastes, and Canticles, were written by Solomon the Son of David. The two first contain the most excellent moral Maxims and Observations; and the last is altogether poetical and figurative. These Books viz. Job, Psalms, Proverbs, Ecclesiastes, and Canticles are called the Hagiographa or Holy Scriptures, in Contradistinction to those which are prophetic or historical.

The rest of the Books of the Old Testament were written by the several Prophets whose Names they bear. They foretell the future State of their own, and of the Nations round about, with an Eye particularly to the Redemption of the World through the promised MESSIAH. They teach us that in this Restoration of Mankind, the great Work of God, to which all is referred, and in which all terminate, is to form to himself a Kingdom worthy of him; a Kingdom which alone shall subsist to all Eternity, and to which all others shall give Place; that Jesus CHRIST shall be the Founder and Ruler of this Kingdom, according to the great Prophecy of Daniel, who, after he had seen in a Vision the Succession and Ruin of all the great Empires of the World, sees at last the Son of Man drawing near to



of Days, a sublime Expression for the ETERNAL; and immediately adds, that God gave him Dominion and Glory, and a Kingdom, that all Nations and Languages should serve him: His Dominion is an everlasting Dominion, which shall not pass away, and his Kingdom that which shall not be destroyed.

Thus we see God from the Beginning preparing the Formation of the Christian Church; revealing gradually to Man the Mysteries of Salvation; frequently renewing to him the Promise of a Redeemer; transmitting from Age to Age these capital Doctrines by the long Life of the first Patriarch; and afterwards committing them in Trust to a chosen Family. Of these he forms a peculiar People, enclosed within the Precincts of a particular Country which he had long before prepared for them; separated from the Nations by distinct Laws and Customs, and exposed as a Spectacle to the rest of the World, by the innumerable Wonders wrought among them. He was not content to guide them like other People, by a general and common Providence; but himself became their Head, Legislator, and King. He was pleased that this People should be the Figure of what was afterwards to happen to the Church, by their Departure out of Egypt, their Wanderings in the Desert, their Entrance into the Land of Promise, their Wars and Conquests, their Captivity in Babylon, and their Return to Canaan; and that the Expectation of the Messiah, promised to the Patriarchs, figured by the Ceremonies and Sacrifices of the Law, foretold by the Prophets, should be the proper and especial Character of this People, to distinguish them from all Nations upon the Earth. Can any Object be greater, of nearer Concern, and more worthy the Attention of Mankind, than this Scripture, wherein God has thought fit to draw with his own Hand the Plan of our eternal Destiny? To fix the Certainty of Revelation, and establish Religion on a firm Foundation, He has given it two Sorts of Proof, which are at the same Time suited to the Capacities of the most simple, and superior to all the subtilties of the Incredulous; which visibly bear the Character of Omnipotence; and which neither all the Enquiries of Man, or Cunning of Devils, have been able to imitate. These consist of Miracles and Prophecies. The first were plain, public, notorious, multiplied, many



Ways, long foretold and expected, lasting for a Count-  
 Days, and sometimes Years. They were Facts, which  
 dullest Understanding must be sensible of; whereof  
 whole People were not only Spectators and Witnesses,  
 themselves the Matter and the Object; they reaped  
 Advantages and perceived the Effects of them, and  
 their own Happiness or Misery depending on them. The  
 Family of Noah could not forget the Destruction of  
 World by the Deluge, after long continued Warning;  
 nor the miraculous Manner in which they alone had  
 preserved. The Fire descends from Heaven on the  
 righteous Cities. The whole Realm of Egypt is pun-  
 at different Times with ten terrible Plagues. The  
 opens a Passage to the Israelites, and closes to over-  
 Pharaoh and his Army. The People of Israel are fed  
 Manna for forty Years, and drink of the Brooks  
 flow miraculously from the stony Rocks. They are  
 versed with a Cloud from the Heat of the Day, and  
 lightened by Night with a Pillar of Fire. Their Clo-  
 and their Shoes are not worn out in the Course of so  
 a March. The Streams of Jordan forget to flow,  
 the Light of the Sun and Moon continues, to secure  
 Victory. A Shower of Hail-Stones overthrows the  
 my. The Nations in League are dispersed by a vain  
 ror; or turning their Arms against one another, are  
 terminated by a mutual Slaughter. An hundred four-  
 and five thousand are struck dead in one Night. All  
 Prodigious, and a thousand others of the like Nature,  
 ral of which were attested by solemn Feasts established  
 Purpose to perpetuate their Memory, and by sacred So-  
 which were in the Mouths of all the Israelites, could  
 be unknown to the most stupid, nor called in Question  
 the most incredulous.

The same may be said of the Prophecies. We here  
 a Multitude of inspired Men, who speak not doubt-  
 with Hesitation or Conjecture; but with an affirma-  
 Voice, loudly and publicly declare that such and  
 Events should certainly happen in the Time and Place,  
 with all the Circumstances by themselves foretold.  
 what Events? The most particular, the most impor-  
 and such as most nearly concerned the Interest of the  
 tion, and were at the same Time the most remote

outward Appearance. Under Uzziah and Jotham, when Peace and Plenty flourished, when Luxury in Eating, Building, and Furniture, was carried to Excess, what Likelihood was there of the terrible Famine and Shameful Captivity with which Isaiah then threatened the Ladies of the first Distinction; or what Probability of the extreme Misery which actually beset them in the following Reign? When Jerusalem, blocked up by the numerous Army of Sennacherib, was reduced to the last Extremity, without Troops, Provisions, or any Hope of human Assistance, especially after the Army of the Egyptians had been defeated; was the Prediction of Isaiah credible, that the City should not be taken; that it should not be besieged in Form; that the Enemy should not shoot an Arrow against it; and that this formidable Army should be exterminated at once, and its King put to Flight, without any human Concurrence? The entire Destruction of the Kingdom of the ten Tribes; the Captivity of Judah after the Destruction of Jerusalem; the express Term of seventy Years set for the Duration of it; their glorious Return into their own Country; their Deliverer specified and called by his proper Name above two hundred Years before his Birth; the surprising, and till then unheard of, Manner in which this famous Conqueror was to take Babylon; could all this be the Effect of human Foresight? Or what Reason was there to apprehend these Things, when the Prophets then foretold them? These Predictions however, illustrious as they were, served only as a Veil or Preparation for others of far greater Importance, to which the Accomplishment of the former was to give a Degree of Authority and Credit, superior in Strength to all that human Understanding could imagine or desire, for the gaining of a full Conviction and unshaken Belief. I mean the Predictions relating to the MESSIAH, and the Establishment of his Church. These are so clear and plain, and descend to such a Particularity as is truly wonderful. The Prophets have not only marked out the precise Time, the Place, and Manner, of his Birth, the principal Actions of his Life, and the Effects of his preaching; but saw and foretold the most minute Circumstances of his Death, and have related them with almost as much Exactness as the Evangelists themselves, who were Eye Witnesses.

nesses of them. But what shall we say of those Events which make up the Fate of Mankind, take in Extent of all Ages, and are at last happily lost in Eternity which was their End and Design; the Reformation of the Church on Earth by the preaching of separate Persons; the Reprobation of the whole Body of Jewish Nation; the calling of the Gentiles, to be substituted in the Place of the People once so dearly beloved and favoured with such high Privileges; the Abolition of Idolatry; the Dispersion of the Jews into all Parts of Earth, to serve as Witnesses to the Truth of the Scriptures, and the Accomplishment of the Prophecies their future Return to the Faith of CHRIST, which shall be the Consolation of the Church in the latter Days; lastly, the Translation of this Church, after many Trials and Dangers, from Earth to Heaven, there to enjoy perpetual Peace and Felicity? These are the Subjects of the Discourses of the Prophets, and for this End the Holy Scriptures were written. Yet this is not all. The Attributes of the Divine Nature are so clearly laid down to in these Writings, that we cannot well be ignorant, to form wrong Conceptions, of them. Here we are taught such a Religion as is agreeable to that Nature, easy, rational, delightful; to do Justice, to love Mercy, and walk humbly with God.



*Of the CIRCLES of the SPHERE or GLOBE, and of Fixed Stars, Planets and Comets.*

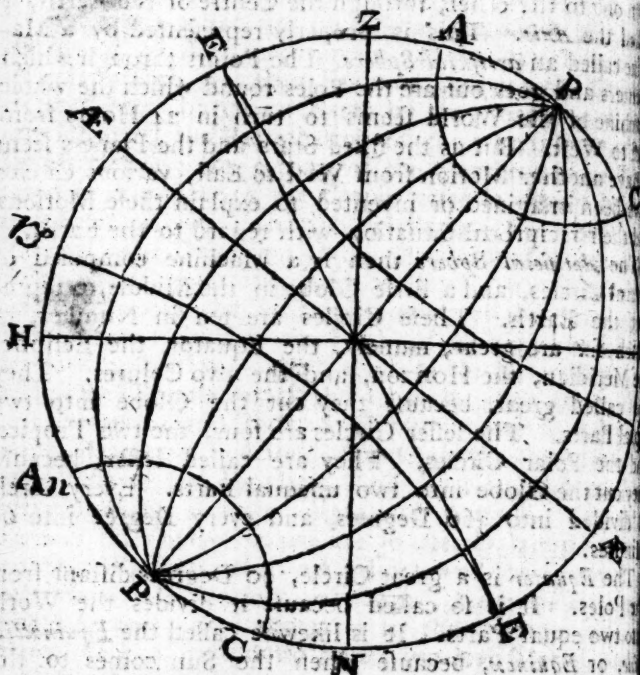
**A** SPHERE or GLOBE is in Shape like a round Ball, and is made to represent the World; because when we view the Heavens they appear to be round, and because the Earth is certainly so, or at least very near it. It was formerly thought to resemble a Lemon, but after exact Measurements, in various Parts of the World, it is found to be like an Orange, a little flattened towards the Poles.

Poles are fixed Points in the Heavens, round about which the Stars seem to turn. And an imaginary Line pass

from one to the other, through the Centre of the Earth, is called the *Axis*. This is properly represented by a Machine called an *artificial Sphere*. The Points through which it enters and goes out are the Poles round which the whole Machine of the World seems to turn in 24 Hours from East to West. But as the fixed Stars and the Planets seem to have another Motion from West to East, various Circles have been imagined or invented to explain these Motions and their reciprocal Situation with regard to the Earth.

The *Artificial Sphere* then is a Machine composed of several Circles, and a little Globe in the Middle to represent the Earth. These Circles are ten in Number, of which six are great, namely, the Equator, the Ecliptic, the Meridian, the Horizon, and the two Colures. They are called great, because they cut the Globe into two equal Parts. The lesser Circles are four, the two Tropics, and the Polar Circles. They are called lesser, because they cut the Globe into two unequal Parts. Every Circle is divided into 360 Degrees, and every Degree into 60 Minutes.

The *Equator* is a great Circle, 90 Degrees distant from the Poles. It is so called because it divides the World into two equal Parts. It is likewise called the *Equinoctial*, or *Equinox*, because when the Sun comes to this Circle the Days and Nights are equal. It is marked in the annexed Diagram with *ÆÆ*. The Uses of it are to divide the World into two equal Parts; that which has the Arctic Pole is called the North, and that which has the Antarctic Pole is called the South. It likewise cuts the Ecliptic in two Points, which are the Points of the Equinoxes, that is, when the Sun comes thereto, the Days and Nights are equal in all Places, except at the Poles, for at one of those Places a Day of six Months begins, and at the other a Night of six Months.



The *Ecliptic* is a Circle, which is placed obliquely to the Sphere, and is so called because the Eclipses happen therein. The Sun makes his annual Progress through this Circle, and is never found out of it.

The *Zodiac* incircles the Sphere like a Belt, and lies on each Side of the Ecliptic to the Extent of 16 Degrees. The Equator divides the Zodiac into two equal Parts, the one North, the other South. They contain Twelve Signs or Constellations. The Northern Half contains Aries ♈, Taurus ♉, Gemini ♊, Cancer ♋, Leo ♌, Virgo ♍; and the Southern Libra ♎, Scorpio ♏, Sagittarius ♐, Capricornus ♑, Aquarius ♒, Pisces ♓. The Ecliptic is distinguished by EE.

The *Meridian* is a great Circle which passes through the Poles of the World, and those of the Horizon, and is, the Zenith and the Nadir. The Sun is upon it every Day at Noon or Twelve o'Clock. It is possible to travel from Pole to Pole under the same Meridian; but if you



er to little East or West you must necessarily change  
It serves to divide the World into two Parts, that on  
Side whereof the Stars rise is called the East, and that  
whereon they set is called the West. It serves to shew the  
Middle of the Day and Night, and the Elevation of the  
Sun. It is the outward Circle in this Figure.

The *Horizon* is of two Kinds, the visible or sensible, and  
rational. The rational Horizon is a great Circle con-  
centric with the Earth. Its Poles are the Zenith and  
Nadir of the Place where we inhabit. The Zenith Z is  
a Point directly over our Heads, and the Nadir is the  
Point opposite thereto under our Feet. It divides the  
Sphere into two equal Parts called *Hemispheres*; the one of  
which is called the *superior* and *visible*; the other *inferior*  
and *invisible*.

Besides the rational Horizon there is one visible and sen-  
sible, which bounds our View when we are in the open  
Air. The Uses of the Horizon are to divide the World  
into the upper and lower Hemispheres, whence it follows,  
that it is Day in one, it is Night in the other. It shews  
the Rising and Setting of the Stars, the Length of Day  
and Night, the Break of Day and Twilight. For when  
the Sun is 18 Degrees below it, the Twilight begins in  
the morning and ends when the Sun begins to rise. It  
serves to shew the Height of the Pole, because it is nothing  
but the Arch or Portion, which is comprehended be-  
tween the Pole of the World and the Horizon. It like-  
wise points out the four Cardinal Points of the World; for  
in Places where the Meridian and Horizon cut each other,  
they are called North and South; and the Places where the  
Horizon and Equator cut each other, are termed the East  
and West. It is marked HH.

The Sphere may be placed in three Manners with regard  
to the Horizon, whence come the Distinctions of a *right*,  
an *oblique*, and a *parallel Sphere*.

The Sphere is *right* when the Poles of the World are  
in the Horizon, and when the Zenith and Nadir  
are in the Equator. In this Position of the Sphere, the  
Arcs described by the Sun in his diurnal Motion are cut  
by the Horizon in two equal Parts. People that live in  
this Sphere, are said to live under the Line, and the  
Sun is directly over their Heads twice a Year. There are  
Places

Places in *Africa*, the *East-Indies* and *America*, directly under the Line, that are well inhabited, and the Days and Nights are equal throughout the Year. Here all the Stars of both Hemispheres may be seen in different Parts of the Year.

A *parallel Sphere* has the Equator parallel to the Horizon, and the Poles of the World are the Zenith and Nadir. In this Case half the Ecliptic is above the Horizon, and the other half below. Those that live there, if any such, have one half of the Year Day, and the other half Night. Besides, they have a Twilight which continues four Months. They can never see but one half of the Heavens.

An *oblique Sphere* is that which has an oblique Horizon. In this Position all the Circles of the Sphere are cut unequally by the Horizon except the Equator. The People in the World, except those that live under the Equator and the Poles, have this Position. The Days and Nights are always unequal, except at the Time of the Equinoxes. This Increase of the Days, as well as the Twilight, becomes more sensible the nearer we approach to the Poles.

The *two Colures* are two great Circles, which cut each other at Right Angles at the Poles of the World; that they make an Angle of 90 Degrees. The one is called the *Equinoxial Colure*, and the other the *Solstitial Colure*. The former passes through the very Beginning of *Aries* and *Libra*; and the other through the very Beginning of *Cancer* and *Capricorn*.

The *Tropics* are two of the lesser Circles, and they are distant from the Equator 23° 45' Degrees, and 46 Minutes. The Tropic of *Cancer* is towards the North, and that of *Capricorn* towards the South. They are marked with the Signs of the Zodiac. When the Sun comes to the Tropic of *Cancer*, he makes the longest Day in all the Year with us, and the shortest Day with those that live on the other Side of the Line, or in the Southern Hemisphere. When he comes to the Tropic of *Capricorn*, he makes the shortest Day with us, and the longest on the other Side of the Line.

The *Polar* or the *Arctic* and *Antarctic Circles*, are distant from the Equator at the Distance of 23 Degrees and 29 Minutes from the Poles.

les of the World, and pass through the Poles of the elliptic. The one is North AC, the other South AnC. Having thus explained the different Circles of the Spheres, it will be proper to say somewhat of the Stars and Planets.

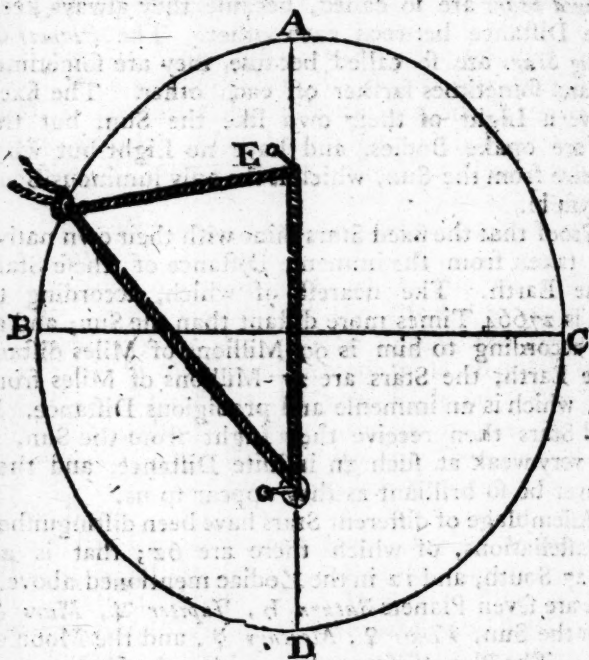
The *fixed Stars* are so called, because they always keep the same Distance between each other. The *Planets* or *Wandering Stars* are so called because they are sometimes nearer, and sometimes farther off each other. The fixed Stars have a Light of their own like the Sun, but the Planets are opaque Bodies, and have no Light but what they receive from the Sun, which is the only luminous Body in our System.

The Proof that the fixed Stars shine with their own native Light is taken from the immense Distance of these Stars from the Earth. The nearest of which, according to *Huygens*, is 27664 Times more distant than the Sun; and as the Sun according to him is 99 Millions of Miles distant from the Earth, the Stars are 27 Millions of Miles from the Sun, which is an immense and prodigious Distance. If the fixed Stars then receive their Light from the Sun, it must be very weak at such an infinite Distance, and they could never be so brilliant as they appear to us.

The Assemblage of different Stars have been distinguished into Constellations, of which there are 62; that is 23 North, 27 South, and 12 in the Zodiac mentioned above.

There are seven Planets *Saturn* ♄, *Jupiter* ♃, *Mars* ♂, ☉ or the Sun, *Venus* ♀, *Mercury* ☿, and the Moon or Luna ☾. The Planets always keep within the Zodiac, and the Circles they move in have not the same Centre as the Earth, or more properly speaking, they move in an *Ellipsis* some improperly called an Oval. We have hitherto, in Compliance with the vulgar Opinion, and for the more easy Explanation of the Subject, talked of the Motion of the Sun; whereas in reality the Sun stands still, and all the Planets move about the Sun, except the Moon, which moves about the Earth as a Centre. It is observable likewise that the Earth itself is a Planet, and moves round the Sun like the rest of the Planets in an elliptical Orbit. In the annex'd Figure, which is an *Ellipsis*, AP is the transverse Diameter, BC is the conjugate Diameter, and F and Q are the Focus's of the Ellipsis. It is made by fixing two strong

strong Pins, one in the Point F, and the other in the Point  $\odot$ , and with a double Thread with a Knot at the End, as in the Figure. The Length of the double Thread must be a little more than that of the Distance of the Pins, and



must be more or less according to the Kind of Ellipsis to be described. Then a Pencil must be put between the Thread, next the Knot, and with an even Hand it must be moved about the Focus's circularly, and then a Curve Line will be described, called an Ellipsis. If the Pins are removed a little nearer each other, the Length of the Thread remaining the same, you will have another Ellipsis, but of a different Kind from the former. If you remove them still nearer, you will have another Kind approaching still nearer to a Circle; and if the Pins are placed close together, you will have an entire Circle. This being premised, I affirm that the Sun is placed at  $\odot$  one of the Focus's, and the Earth moves in the outward Line of the Figure, thro' which

which it passes in the Space of a Year. When the Earth comes to D it is nearest the ☉, as it is evident to the Sight, and is called the *Perihelion*. This happens in December every Year, at which Time it has the quickest Motion. When the Earth comes to A it is farthest from the Sun, and is in the *Aphelion*, at which Time it moves the slowest.

The Sun and the Moon, for we must now speak according to the common Apprehension, are the Planets which concern us most. And among all the Planets the Sun alone, as was said before, shines with its own native Light. Its Motion is not so irregular as that of the rest. It passes through the Ecliptic without ever deviating from it. The Circle that it describes by its daily Motion is parallel to the Equator. The *Apogee* of the Sun, that is, when he is at the greatest Distance from the Earth, is in the seventh Degree of Cancer, and his *Peregrree*, or when hearest the Earth, is seven Degrees of Capricorn. Whence it follows, that he continues seven Days longer in the North Part of the World, than in the South.

Some may wonder that when the Sun is nearer the Earth by some Millions of Miles than in the Summer Time, the Cold should then be the greatest in all Parts of Europe. But we must observe, that at this Time the Sun rises but to a small Height above the Horizon, and consequently the Rays fall very obliquely on the Spot which we inhabit. Besides, it continues but a short Time above the Horizon.

The Sun moves about a Degree every Day from the West to the East by his own proper Motion, whence he runs thro' 360 Degrees in 365 Days, 5 Hours, and 48 Minutes, for which Reason every fourth Year is *Bisextile* or *Leap Year*, and contains 366 Days. But as this contains more than it ought, in Process of Time it became 11 Days too forward, which is the Reason of the late Change of the Stile to bring it back to its original Institution.

Tho' the Moon appears to be the largest of all the Planets, except the Sun, it is the smallest of them all, and the Occasion of its seeming so large is, because it is near the Earth; for the greatest Distance is no more than 31 Diameters of the Earth, and the least Distance is only 27. Now as the Diameter of the Earth is 6890 Geographical Miles.



Miles of 60 to a Degree, this Number multiplied by 27, will shew the greatest and least Distance of the Moon from the Earth in Geometrical Miles.

The *Moon* is an opaque Body, and has no other Light than what it receives from the Sun. The different Manners in which it is placed, with regard to the Sun, is called its *Phases*; which are principally four, the new and full Moon and the Quarters; the new Moon, is when the Moon is in Conjunction with the Sun. For it being then placed between the Earth and the Sun, that Side which is enlightened is turned towards the Sun, and consequently cannot shine upon us. But as she gets at a Distance from the Sun, one Part is enlightened which turns towards us, which increasing daily, at length attains the first Quarter when half its Disk or Face is illuminated; then as it goes farther and farther, its Light increases till it comes to the Middle of the Circle, when the Moon is in Opposition to the Sun; then the whole enlightened Part is turned towards us, and we call it the full Moon. As it approaches nearer the Sun the light Part grows less, and when it comes to three Parts of its Revolution, then it is in the last Quarter. The Difference between the first and last Quarter consists in this; that at the first Quarter the brightest Part is towards the East, and at the last Quarter towards the West.

The Revolution of the Moon is performed in 27 Days and about 8 Hours; but because the Sun, during this Time makes a Progress of 27 Degrees, it cannot overtake the Sun under two Days more. Whence it happens that from one Conjunction to another, there must be at least 29 Days. The Lunar Year is composed of 12 of these Conjunctions, whence the Months consist of 29 and 30 Days alternately; all which together make 354 Days, which is eleven Days less than the solar Year.

The proper Motion of the Moon is performed in a Circle, which cuts the Ecliptic in two Points, which are called *Nodes*. The Distance of this Circle from the Ecliptic in the Place where it is greatest, is 5 Degrees 18 Minutes; and as the Nodes do not always cut the Ecliptic in the same Place, but have a retrograde Motion, the Sun cannot be eclipsed every New Moon, nor the Moon be eclipsed when at full, for Eclipses only happen when the Sun is

near the Nodes; at which Time if it is in the Opposition so circumstantiated, the Earth gets between the Moon and the Sun, then the Moon is eclipsed; and at the new Moon, if the Moon gets between the Sun and us, it eclipses the Sun. When the Moon is eclipsed it is deprived of Light, and appears the same wherever it is visible. But it is not so with the Sun, because of the Moon's Parallax, which renders it visible in some Places, but not in others.

In order to comprehend more readily this Declination of the Moon's Orbit, you may put two Hoops of a Barrel within the other, and let them be about four Fingers distant in two Places; one of the Hoops will represent the Ecliptic, or Path of the Sun, and the other, the Orbit, or Path of the Moon; and the Places where the Hoops cross each other will represent the Nodes which are called the Head and Tail of a Dragon. These Nodes are not fixed, as was before observed, but sometimes cut the Ecliptic in one Place, and sometimes in another.

The other Planets, that is Saturn, Jupiter, Mars, Venus, and Mercury, generally move from the West towards the East, by their own proper Motions, describing the Circles which cut the Ecliptic in two Places like the Moon.

*Saturn* performs his Revolution round the Sun in 29 Years and 155 Days; *Jupiter* in eleven Years, 313 Days; *Mars* in two Years, and 321 Days; *Venus* in 224 Days, eighteen Months; and *Mercury* in 88 Days.

The Diameter of the Sun, is 100 Diameters of the Earth, and is a Million of Times larger than the Earth. The Diameter of *Saturn* is somewhat less than ten Times the Diameter of the Earth, and is 980 Times larger than the Diameter of the Earth; it is sometimes distant from the Sun 221870 Semidiameters of the Earth, and never less than 197802. The Diameter of *Jupiter* is a little more than 10 Diameters of the Earth; its 1170 Times larger than the Earth, and is 110000 Semidiameters of the Earth distant from the Sun. *Mars* is three-fifths of the Diameter of the Earth; and is equal to a fifth Part of the Diameter of the Earth; its greatest Distance from the Sun is 6630 Semidiameters of the Earth, and the least Distance is 626. *Venus* has a Diameter equal to that of the Earth, and is of the same Size; its greatest Distance from the Sun is

is 16016 Semidiameters of the Earth, and its least Distance 15796. The Diameter of *Mercury* is one-third of the Diameter of the Earth, and its Bulk equal to a twenty-seventh Part of the Bulk of the Earth; its greatest Distance from the Sun is 10274 Semidiameters of the Earth, and its least 6754. The Diameter of the *Moon* is a little more than one-fourth of the Diameter of the Earth, and is equal to the fiftieth Part of the Globe of the Earth; its greatest Distance from the Earth is 62 of its Semidiameters, and its least 34. The Diameter of the Earth is 6890 geographical Miles, and its Semidiameter 3445 of the same Miles. Hence the Distances and Diameters of all the Planets may be readily found in Miles, using the Diameters or Semidiameters, above-mentioned, and multiplying the one by the other.

Having thus given an Account of the Magnitudes and Distances of the Planets, it will not be amiss to give a more philosophical Account of them, in such a Manner that the young Inquirer may be enabled to talk a little rationally about them.

The Sun is an immense Body formed of celestial Fire or of Matter more like Fire than any Thing we yet know; but though it is immense, with regard to us, yet it takes up but a Point of that infinite Place wherein it is placed; we cannot say the Space it takes up is either the Centre or the Extremity of this Space; for to talk properly of the Centre and the Extremity, it must have a Figure and Bound. Every fixed Star is like a Sun which, probably, belongs to another World.

While the Sun turns about its own Axis in twenty-four Days and a half, the Matter of which it is formed escapes on all Sides, and is extended to the greatest Distances; not only to us, but far beyond us. This Matter is that of which Light consists, and has such a prodigious Rapidity that it reaches us in half a quarter of an Hour. It is reflected when it falls upon Bodies which it cannot penetrate. By which Means we know that the Bodies of the Planets are opaque, because they send it back to us; for when the Sun is behind us in the other Hemisphere, we are then able to perceive this glimmering Light.

There are six Planets that receive their Light from the Sun, viz. *Mercury*, *Venus*, the *Earth*, *Mars*, *Jupiter*, and *Saturn*. Each describes a large Orbit round the Sun, and

being placed at different Distances, make their Révolutions about him at different Times, as has been already mentioned. There is one Thing remarkable in these Révolutions, that they are all made the same Way, which caused some Philosophers to imagine they were all carried about by a Vortex or Kind of a Whirlpool. But the Absurdity of this Opinion is now generally known.

Several Planets as they make a Progress in their own Orbits, turn about on their own Axis at the same Time, perhaps they have all a like Motion; but we are not sure of any more than the Earth, which takes up 24 Hours; of Mars, who performs it in 25; and of Jupiter, who turns about his Axis in 10 Hours. As for Venus, though the best Astronomers allow this Planet to have a Revolution, which is confirmed by the various Faces that appear to us, yet they are not agreed about the Time, some affirming it to be 23 Hours, and others 24.

The Moon is not a Planet of the first Rank, because it does not make its Orbit immediately about the Sun, but about the Earth. These Sort of Planets are called *Secondary* or *Satellites*; and as the Earth has one, Jupiter has four, and Saturn five.

The Laws of the Planets Motion is a late Discovery, and appears that as they move about the Sun there must be an attractive Force which keeps them in their Orbits, otherwise they would fly off in a right Line. All Bodies belonging to our System like the Planets describe an Ellipsis, one of whose Focus's the Sun must necessarily be placed, and then this Focus must be so much nearer the Extremity of the Ellipsis in Proportion as it is lengthen'd; hence it comes to pass that when the Planet is in a certain Part of its Orbit, called the *Perihelion*, it must be much nearer the Sun; and when it is in another, called the *Aphelion*, it must be at a greater Distance from the Sun. As for the Planets mentioned, their Differences are not very considerable, because their Orbits are pretty near circular.

Thus COMETS, which have of late been allowed to be Planets, are subject to the same Laws as the other six; but they describe Ellipsis which are not only long, but of all degrees of Length. The Sun placed in the Focus of the Ellipsis of the Planets, is likewise in the Focus of the Ellipsis of the Comets; and their Motion is regulated by the same Laws as the rest; but as the Sun is very near one of their

their Extremities, the Distance of the Comets from the Sun are very different in the different Parts of the Orbits. Some, as that in 1680, have been so near in the *Perihelion* as to be no farther from the Sun than a small Part of its Diameter, and when they have been so near they fly off to an immense Distance, and move on to make their Progress beyond the Region of Saturn.

Comets take up much more Time in performing the Revolutions round the Sun than the Planets, for the slowest of the Planets does not take up thirty Years, and the quickest of the Comets is at least seventy-five Years in coming to the same Place again, and some are several Ages in performing their Revolutions.

The Length of their Orbits, and the Slowness of the Revolutions, is the Reason that the Returns of most are uncertain. As for the Planets, they never get out of Sight, whereas the Comets make their Appearance only during a small Part of their Course, which they run in the Neighbourhood of the Earth; they perform the rest in the highest Regions of the Heavens, during which Time they are lost to us, and when one appears again, we are not sure it is the same, but by searching after the Courses of the Comets of former Times, if there are any such supported by proper Observations.

By this Method we are pretty certain that the Period of the Comet which appeared in 1682 is seventy-five Years, because one of the same Kind appeared in 1607, 1531, and 1456; if it appears again in 1757, or 1758, we shall be more certain. That which appeared in 1661 will come again in 1790; and that which was seen in 1680, will be seen again 575 Years from that Time.

These Comets were formerly taken to be Forerunners of Plagues, Famine, and War, but this is found to be grounded. However they may be physical Causes of very great Events, for as these Bodies move very freely in all Directions, it is possible that one of them may meet with some Planet, or even the Earth in its Course, and then, without Doubt, terrible Accidents will be produced. The first Thing will be a great Change in their Motions, and there will follow great Alteration in the Axis and Poles of the Earth, that Part of the Earth that was near the Equator will be near the Poles, and the contrary; they will likewise produce other Effects much more fatal; for these Comets



re Tails, which are immense Torrents of Exhalations and Vapours, that the Heat of the Sun forces from these Bodies, for Comets have no Tails till they come near the Sun and which increase the nearer they approach, and diminish as they get at a Distance.

A Comet with its Tail may pass so near the Earth, that it may be overwhelmed with the Torrent it carries along with it, or in an Atmosphere of the same Nature that surrounds it. The Comet which drew near the Sun in 1680, was twenty-eight thousand Times more hot than the Earth in Summer, or according to Sir Isaac Newton, 2000 Times more hot than red-hot Iron, and that a Mass of red hot Iron as big as the Earth would take 50,000 Years to cool again, and if so, what Heat must the Comet have when passing from the Sun, it traversed the Orbit of the Earth: if it had passed nearer it would have reduced the Earth to Ashes or turned it into Glass, or if the Tail alone had reached us we should have been overwhelmed with a burning River, which would have killed all the Inhabitants just in the same Manner as boiling Water thrown upon a Nest of Ants destroys them all. Perhaps the Plagues said to have attended the Appearance of Comets may have proceeded from the Exhalations of the Comet, mixed with our Atmosphere, causing sensible Alterations therein fatal both to Animals and Plants; for it is very probable that Vapours brought from such a Distance, and excited by so great a Heat should be fatal to all Things on the Earth, producing Plague and Sickness.

But the worst Accident that can happen from a Shock of the Earth and a Comet, may be the breaking them both into Pieces, which would prove the Destruction of them both, and yet the Force of Gravity might new mould them into one or more new Planets. However, though it may be doubted whether this Earth has undergone such a Catastrophe or not, yet we are certain it must have undergone very great Disorders and Changes; the Print of Fishes and even Trees themselves petrified or turned into Stone, at great Distances from the Sea, and even at the Tops of very high Mountains, are like so many Medals, as an incontestable Proof of some such Event.

A small Shock of a Comet might not break the Globe of the Earth all to Pieces, but it might cause great Changes in

in the Situations of the Earth and Seas, the Waters during such a Shock might rise to a great Height in some Places and overwhelm vast Regions on the Surface of the Earth, which it would forsake afterwards; such a Shock may be occasioned the Floods mentioned in sacred and prophetic Histories, for the irregular Dispositions of the Layers of the Earth, the whelming of Mountains upon Mountains, is more like the Ruins of the ancient World, than the primitive State of one newly formed.

The same Taing may happen to *Mars*, *Venus*, or *Mercury*; but as for *Saturn* and *Jupiter* their Bulk is so enormous, that they seem less exposed to the Insults of a Comet and it would be a wonderful Sight if we should live to perceive a Comet fall upon these lesser Planets and break them into Pieces, or carry them off, and turn them into Satellites.



#### *Of the SPHERE as applied to GEOGRAPHY.*

**T**HE Word Globe, as well as that of Sphere, signifies a Ball; and the Earth is looked upon as a Ball, Account of its Roundness; this is proved by Eclipses of the Moon, caused by the Shadow of the Earth upon the Moon. As the Earth and the whole Heavens turn, or seem to turn about the Earth, which in the Sphere is placed in the Centre of the World; the Geographers have transferred the greatest Part of the Circles of the Sphere to the Earth. By this Means the Earth, as well as the Heavens, has its Poles, its Axis, its Equator, its Ecliptic, its Meridian, its Horizon, its Tropics, and its Polar Circles.

The Poles of the Earth are two Points on its Surface through which its Axis passes. The Axis of the Earth which may be conceived to be the same as that of the World is a Line which passes quite thro' the Earth. The Equinoctial Line, or Equator, is a Circle on the Surface of the Globe opposite to the Equator in the Heavens; it cuts the Globe into two equal Parts, the North and the South. The Ecliptic on the Earth is a great Circle which Answers to the Ecliptic in the Heavens; its greatest Distance from the Equator is twenty-three Degrees, twenty-nine Minutes. The Tropics are lesser Circles, distant from the Equator 23 Degrees

Minutes. The Polar Circles are small Circles at the same Distance from the Pole. The Horizon is a great Circle which divides the Globe into two Hemispheres, the upper and the lower; the Horizon of the Globe may become the Horizon of any Place or Town, by placing it under the grand Meridian, and by elevating the Pole above the Horizon to the Latitude of the Place. The Meridian is a great Circle which passes by the Poles of the Globe, and cuts the Horizon in North and South Points; it likewise divides the Globe into two Parts, the East and the West.

We may place the first Meridian where we will; some place it at Ferro, others at London, others at Paris, and others at Pekin in China in the Maps of that Country. The Spaniards place theirs at Toledo, the Portuguese at Terceira, one of the Azores, and the Dutch at the Pike of Teneriff. This leads me to speak of the LONGITUDE, which is the Distance from the first Meridian to the Meridian of the Place, or an Arch of a Parallel comprehended between the first Meridian and the Meridian of a Place.

The LATITUDE is the Distance of a Place from the Equator, and may be either North or South; or the Latitude of a Place is an Arch of the Meridian contained between the Equator and the Place; this is the same as the Elevation of the Pole above the Horizon. The Degree of Longitude may be reckoned along a Circle parallel to the Equator, and the Latitude by a great Circle that passes through the Poles.

The Degrees of Latitude are nearly equal, I say nearly, as the Earth is flattened towards the Poles, every Degree increases a little from the Equator to the Poles, which is never is neglected in the common Computations, though it is to be rectified in some Maps; they contain 69 and a Quarter of English Statute Miles, or 20 Marine Leagues, which is 60 Miles to a Degree; according to which the following Table is computed.

*A TABLE, shewing the Quantity of the Degrees of a Latitude in every Parallel of Latitude.*

|           | Lat. | Min. | Sec. | Lat. | Min. | Sec. |
|-----------|------|------|------|------|------|------|
| Equator   | 0    | 60   | 0    | 38   | 47   |      |
| Parallel. | 1    | 59   | 56   | 39   | 46   |      |
|           | 2    | 59   | 54   | 40   | 46   |      |
|           | 3    | 59   | 52   | 41   | 45   |      |
|           | 4    | 59   | 50   | 42   | 44   |      |
|           | 5    | 59   | 46   | 43   | 43   |      |
|           | 6    | 59   | 40   | 44   | 43   |      |
|           | 7    | 59   | 37   | 45   | 42   |      |
|           | 8    | 59   | 24   | 46   | 41   |      |
|           | 9    | 59   | 10   | 47   | 41   |      |
| Parallel. | 10   | 59   | 0    | 48   | 40   |      |
|           | 11   | 58   | 52   | 49   | 39   |      |
|           | 12   | 58   | 40   | 50   | 38   |      |
|           | 13   | 58   | 28   | 51   | 37   |      |
|           | 14   | 58   | 12   | 52   | 37   |      |
|           | 15   | 58   | 0    | 53   | 36   |      |
|           | 16   | 57   | 40   | 54   | 35   |      |
|           | 17   | 57   | 20   | 55   | 34   |      |
|           | 18   | 57   | 4    | 56   | 33   |      |
|           | 19   | 56   | 44   | 57   | 32   |      |
|           | 20   | 56   | 24   | 58   | 31   |      |
|           | 21   | 56   | 0    | 59   | 31   |      |
|           | 22   | 55   | 36   | 60   | 30   |      |
|           | 23   | 55   | 12   | 61   | 29   |      |
|           | 24   | 54   | 48   | 62   | 28   |      |
|           | 25   | 54   | 24   | 63   | 27   |      |
|           | 26   | 54   | 0    | 64   | 26   |      |
|           | 27   | 53   | 28   | 65   | 25   |      |
|           | 28   | 53   | 0    | 66   | 24   |      |
|           | 29   | 52   | 28   | 67   | 23   |      |
|           | 30   | 51   | 56   | 68   | 22   |      |
|           | 31   | 51   | 24   | 69   | 21   |      |
|           | 32   | 50   | 52   | 70   | 20   |      |
|           | 33   | 50   | 20   | 71   | 19   |      |
|           | 34   | 49   | 44   | 72   | 18   |      |
|           | 35   | 49   | 8    | 73   | 17   |      |
|           | 36   | 48   | 32   | 74   | 16   |      |
|           | 37   | 47   | 56   | 75   | 15   |      |

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TABLE continued.

| Lat. | Min. | Sec. | Lat. | Min. | Sec. |
|------|------|------|------|------|------|
| 76   | 14   | 32   | 84   | 6    | 12   |
| 77   | 13   | 32   | 85   | 5    | 12   |
| 78   | 12   | 32   | 86   | 4    | 12   |
| 79   | 11   | 28   | 87   | 3    | 12   |
| 80   | 10   | 24   | 88   | 2    | 4    |
| 81   | 9    | 20   | 89   | 1    | 4    |
| 82   | 8    | 20   | 90   | 0    | 0    |
| 83   | 7    | 20   |      |      |      |

In general in Maps of the World, the Degrees of Longitude are placed on the Equator, and those of Latitude on the grand Meridian. In Maps of particular Places the Longitude is placed at the Top and the Bottom, and the Latitudes on the Right and Left.

*Of the DIVISIONS of the EARTH formed by the Circles of the Globe.*

THE first Division of the Earth is into Zones; for the Tropics and Polar Circles divide the Globe into five Parts called Zones. The Torrid Zone is contained between the Tropics, and is 27 Degrees in Breadth all round the Globe. Its Inhabitants are called Amphiscians, because they see the Shadow of the Sun turned sometimes towards one Pole and sometimes towards the other. The two temperate Zones are comprehended between the Tropics and the Polar Circles; they are 43 Degrees in Breadth, and the People which inhabit them are called Heteroscians, because the Shadow of the Sun at Noon always turns the same Way, the one towards the Pole Artic, and the other towards the Pole Antarctic. The two frigid or frozen Zones are contained between the Polar Circles and the Poles; they contain 23 Degrees and a half; those that live under them are called Periscians, because the Shadow always turns round about them, according to the different Motions of the Sun. The second Division of the Earth is by Longitudes and Latitudes. As the Tropics and Polar Circles divide the Earth into five Zones, and from a triple Diversity of Sha-

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dows, so the Longitudes and Latitudes from a threefold Division of the Earth; those that inhabit the same Latitude in the same Hemisphere, at the Distance of 180 Degrees in Longitude, are called Pericecians, that is to say, circular Inhabitants; they live in the same Climate, but their Hours are opposite. Those that live in the same Longitude and Latitude, but in different Hemispheres, are called Antecians, that is to say, opposite Inhabitants, their Seasons being opposite. Thus when it is Winter with those that live in the Northern Part, it is Summer with those that live in the Southern Part. The Antipodes are those that live directly opposite to each other; their Seasons, Days, and Hours are all contrary.



### Of the CLIMATES.

**T**HE Climates are Spaces on the Earth comprehended between two Parallels, at the End of which the Days are Half an Hour or a Month longer. In order to understand this Definition we must observe, that the longest Day under the Equator consists of 12 Hours, and in Proportion as we advance towards the Polar Circles, the Increase of the Days every Half Hour makes a Climate. At the Polar Circles the longest Day is 24 Hours, and beyond these the Climates increafe, not by half Hours, but by Months, as far as the Poles where the Day is six Months without taking Notice of Twilight.

It may seem strange that the Climates of Hours should contract the Latitudes the nearer they come to the Pole, and that the Months enlarge them at the same Time, insomuch that from the Equator to 59 Degrees, 14 Minutes, there are but twelve Climates, and yet from hence to 66 Degrees, 31 Minutes, there are twelve Climates. Likewise from the Polar Circle to 73 Degrees, 20 Minutes, there are three Climates of Months, and yet from thence to the Pole there are but three Climates. The first Disproportion arises from the Obliquity of the Tropics with the Horizon, and the second from the Progress of the Sun in the Ecliptic.

We may readily know the Climate a Town or City is placed in, provided we know the Length of the longest Day, by the Help of the following Table.

TABLE

TABLE of CLIMATES and PARALLELS.

| Climates. | Parallels. | Longest Day. |    | Latitude. |      | Amplitude. |      |
|-----------|------------|--------------|----|-----------|------|------------|------|
|           |            | H.           | M. | deg.      | min. | deg.       | min. |
| Equator   | 0 Begin.   | 12           | 0  | 0         | 0    |            |      |
| 1         | 1 Mid.     | 12           | 15 | 4         | 15   | 0          | 1    |
|           | 2 End.     | 12           | 30 | 8         | 25   | 8          | 25   |
| 2         | 3 Mid.     | 12           | 45 | 12        | 30   |            |      |
|           | 4 End.     | 13           | 0  | 16        | 25   | 8          |      |
| 3         | 5 Mid.     | 13           | 15 | 20        | 15   |            |      |
|           | 6 End.     | 13           | 30 | 23        | 50   | 7          | 25   |
| 4         | 7 Mid.     | 13           | 45 | 27        | 40   |            |      |
|           | 8 End.     | 14           | 0  | 30        | 20   | 6          | 30   |
| 5         | 9 Mid.     | 14           | 15 | 33        | 40   |            |      |
|           | 10 End.    | 14           | 30 | 36        | 28   | 6          | 8    |
| 6         | 11 Mid.    | 14           | 45 | 39        | 2    |            |      |
|           | 12 End.    | 15           | 0  | 41        | 22   | 4          | 52   |
| 7         | 13 Mid.    | 15           | 15 | 43        | 32   |            |      |
|           | 14 End.    | 15           | 30 | 45        | 29   | 4          | 7    |
| 8         | 15 Mid.    | 15           | 45 | 47        | 20   |            |      |
|           | 16 End.    | 16           | 0  | 49        | 1    | 3          | 31   |
| 9         | 17 Mid.    | 16           | 15 | 50        | 33   |            |      |
|           | 18 End.    | 16           | 30 | 51        | 58   | 3          | 7    |
| 10        | 19 Mid.    | 16           | 45 | 53        | 17   |            |      |
|           | 20 End.    | 17           | 0  | 54        | 27   | 2          | 49   |
| 11        | 21 Mid.    | 17           | 15 | 55        | 34   |            |      |
|           | 22 End.    | 17           | 30 | 56        | 37   | 2          | 10   |
| 12        | 23 Mid.    | 17           | 45 | 57        | 32   |            |      |
|           | 24 End.    | 18           | 0  | 58        | 29   | 1          | 52   |
| 13        | 25 Mid.    | 18           | 15 | 59        | 14   |            |      |
|           | 26 End.    | 18           | 30 | 59        | 59   | 1          | 29   |
| 14        | 27 Mid.    | 18           | 45 | 60        | 40   |            |      |
|           | 28 End.    | 19           | 0  | 61        | 18   | 1          | 20   |
| 15        | 29 Mid.    | 19           | 15 | 61        | 55   |            |      |
|           | 30 End.    | 19           | 30 | 62        | 25   | 1          | 7    |

TABLE continued.

| Climates. | Parallels. | Longest Day. | Latitude, |    | Amplitude |
|-----------|------------|--------------|-----------|----|-----------|
|           |            |              | H.        | M. | deg. min. |
| 16        | 31 Mid.    | 19           | 45        | 62 | 54        |
|           | 32 End.    | 20           | 0         | 63 | 22        |
| 17        | 33 Mid.    | 20           | 15        | 63 | 40        |
|           | 34 End.    | 20           | 30        | 64 | 6         |
| 18        | 35 Mid.    | 20           | 45        | 64 | 30        |
|           | 36 End.    | 21           | 0         | 64 | 49        |
| 19        | 37 Mid.    | 21           | 15        | 65 | 6         |
|           | 38 End.    | 21           | 30        | 65 | 21        |
| 20        | 39 Mid.    | 21           | 45        | 65 | 35        |
|           | 40 End.    | 22           | 0         | 65 | 47        |
| 21        | 41 Mid.    | 22           | 15        | 65 | 57        |
|           | 42 End.    | 22           | 30        | 66 | 6         |
| 22        | 43 Mid.    | 22           | 45        | 66 | 14        |
|           | 44 End.    | 23           | 0         | 66 | 20        |
| 23        | 45 Mid.    | 23           | 15        | 66 | 25        |
|           | 46 End.    | 23           | 30        | 66 | 28        |
| 24        | 47 Mid.    | 23           | 45        | 66 | 30        |
|           | 48 End.    | 24           | 0         | 66 | 31        |
| Months.   |            |              |           |    |           |
|           | 25         | 1            | 67        | 30 | 0         |
|           | 26         | 2            | 69        | 30 | 2         |
|           | 27         | 3            | 73        | 20 | 3         |
|           | 28         | 4            | 78        | 20 | 5         |
|           | 29         | 5            | 84        | 00 | 5         |
|           | 30         | 6            | 90        | 00 | 6         |

*A Description of the TERRESTRIAL GLOBE.*

**A** Globe is a spherical or round Body whereon Terrestrial Circles are inscribed; and the Count exhibited to represent all Parts of the Earth. On

obes the Towns are marked with (o), on others by the  
ape of a little House; Rivers by a black Line; Roads  
a double Line; or a double-pricked Line; Mountains  
a Figure shaded like a Bell; the Sea by a green Colour,  
white Space, &c.

The Appurtenances of a Globe are, first the Axis, re-  
sented by a Wire run through both Poles. 2. A Brass  
circle representing the first Meridian, wherein the Globe  
ons on its Axis. 3. A wooden Frame representing the  
orizon, on which the Course of the Sun is inscribed, and  
thin which the brazen Meridian turns by Means of the  
atches. 4. The Horary Circle; it is fixed in the bra-  
Meridian in such a Manner as to make the Pole its  
entre. 5. The Quadrant of Altitude; which is a thin  
Plate screwed to the brazen Meridian, and graduated  
h 90 Degrees, answering to one fourth Part of the Equa-  
6. The Semicircle of Position; this is a thin narrow  
ate of Brass exactly answering to one half of the Equator,  
taining 180 Degrees. 7. The Compass; it is a round  
rle like a Wheel, with 32 Points issuing from its Centre,  
e of which is a Flower-de-luce, and points due North.  
usually stands on the Pedestal of the Horizon.

The Globe is of great Use to explain Geography, that  
whatever relates to the terrestrial Circles, as well as the  
pperties of different Places. It is very easy and pleasant  
Learners, and will explain a great Number of Problems,  
which I shall give a few by Way of Example.

The Globe is rectified by raising the Pole to the given  
titude, as suppose London; then fix the Quadrant of  
titude in the Zenith, and by the Compass on the Pedestal  
the Globe so that the brazen Meridian may stand due  
orth and South, according to the Needle, and then it is  
e.

The various Seasons of the Year are explained by the  
iptic, which is divided into four Parts by Colours, to  
inguish the four Seasons of the Year, allowing three  
as to each. The Northern Hemisphere has for the  
ing, *Aries*, *Taurus*, and *Gemini*; for the Summer, *Can-*  
*Leo*, and *Virgo*, for the Autumn, *Libra*, *Scorpio*, and  
*Sagittarius*; *Capricorn*, *Aquarius*, and *Pisces*, for the Winter.  
ese three last Signs make the Summer in the Southern  
emisphere; and *Cancer*, *Leo*, and *Virgo*, the Winter,

*Libra*, *Scorpio*, and *Sagittarius*, make the Spring; and *Aries*, *Taurus*, and *Gemini*, the Autumn; so that when it is Spring in one Hemisphere, it is Autumn in the other; and when it is Summer in one Hemisphere, it is Winter in the other.

To find the Longitude of a Place, as Paris; turn the Globe about till you bring this City under the Brass Meridian, and then the Degrees which the Meridian cuts on the Equator is the Longitude; likewise the Distance between the Equator and the Brass Meridian is the Latitude.

To find the Place of the Sun on a given Day, for Instance the 18th of August; seek for this Day on the Horizon, and you will find the twenty-third Degree of Leo, in the Circle of the Signs. Then seek the same Degree in the Ecliptic and you will see where the Place is on the Globe.

To find the Day wherein the Sun is perpendicular to a Place: Such a Place must be always in the Torrid Zone. Place the Town in Question, for Instance, Goa, which is in the sixteenth Degree of North Latitude, under the Brass Meridian, and observe what Degree of the Ecliptic will pass under this Latitude when the Globe is turned about, and you will find two, the 13th Degree of Taurus, and the 17th Degree of Leo. When the Sun therefore shall be in the 13th Degree of Taurus, on the 30th of May, or in the 17th Degree of Leo, on the 10th of August, it will be perpendicular to Goa.

To find the Rising and Setting of the Sun on the 20th of May. The Globe being rectified to the Latitude of the Place, seek for the Place of the Sun on that Day, which is 29 Degrees of Taurus. Then place London under the brass Meridian, and bring the Hour Index to the South. Afterwards turn the Globe towards the East, till the 29th Degree of Taurus touches the Horizon; do the same on the West Side of the Globe, and the Index of the Hour Circle will point at eleven Minutes past Four in the Morning, and to forty-nine Minutes past Seven in the Evening.

To know what Hour it is at one Place when it is Noon at another. As for Example at Vienna, when it is Twelve at Paris. You must put Paris under the Brass Meridian, and the Index of the Hour Circle on the South. Then turn the Globe towards the West, till Vienna comes under the brass Meridian, and the Index will point to One in the Afternoon. The Reason of this is, that Vienna is



than Paris one Hour, or fifteen Degrees. You may  
 the same for a Town that lies West.  
 But though the Globe is of great Use in these and many  
 other Particulars, yet the following Tables will give a  
 more exact Account of the Length of Days and Nights, and  
 the Rising and Setting of the Sun, than can be gained by  
 the largest hitherto published. But it will be proper to  
 observe, that these Tables give the Times when the Sun  
 appears to rise and set; for the Refraction of the Sun,  
 which is 32 Minutes at the Horizon, raises the Sun above  
 sooner in the Morning, and later at Night, than the  
 common Tables.

|      | 0   | 1   | 2   | 3   | 4   | 5   | 6   |
|------|-----|-----|-----|-----|-----|-----|-----|
| 10   | 001 | 002 | 003 | 004 | 005 | 006 | 007 |
| 20   | 008 | 009 | 010 | 011 | 012 | 013 | 014 |
| 30   | 015 | 016 | 017 | 018 | 019 | 020 | 021 |
| 40   | 022 | 023 | 024 | 025 | 026 | 027 | 028 |
| 50   | 029 | 030 | 031 | 032 | 033 | 034 | 035 |
| 60   | 036 | 037 | 038 | 039 | 040 | 041 | 042 |
| 70   | 043 | 044 | 045 | 046 | 047 | 048 | 049 |
| 80   | 050 | 051 | 052 | 053 | 054 | 055 | 056 |
| 90   | 057 | 058 | 059 | 060 | 061 | 062 | 063 |
| 100  | 064 | 065 | 066 | 067 | 068 | 069 | 070 |
| 110  | 071 | 072 | 073 | 074 | 075 | 076 | 077 |
| 120  | 078 | 079 | 080 | 081 | 082 | 083 | 084 |
| 130  | 085 | 086 | 087 | 088 | 089 | 090 | 091 |
| 140  | 092 | 093 | 094 | 095 | 096 | 097 | 098 |
| 150  | 099 | 100 | 101 | 102 | 103 | 104 | 105 |
| 160  | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| 170  | 113 | 114 | 115 | 116 | 117 | 118 | 119 |
| 180  | 120 | 121 | 122 | 123 | 124 | 125 | 126 |
| 190  | 127 | 128 | 129 | 130 | 131 | 132 | 133 |
| 200  | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
| 210  | 141 | 142 | 143 | 144 | 145 | 146 | 147 |
| 220  | 148 | 149 | 150 | 151 | 152 | 153 | 154 |
| 230  | 155 | 156 | 157 | 158 | 159 | 160 | 161 |
| 240  | 162 | 163 | 164 | 165 | 166 | 167 | 168 |
| 250  | 169 | 170 | 171 | 172 | 173 | 174 | 175 |
| 260  | 176 | 177 | 178 | 179 | 180 | 181 | 182 |
| 270  | 183 | 184 | 185 | 186 | 187 | 188 | 189 |
| 280  | 190 | 191 | 192 | 193 | 194 | 195 | 196 |
| 290  | 197 | 198 | 199 | 200 | 201 | 202 | 203 |
| 300  | 204 | 205 | 206 | 207 | 208 | 209 | 210 |
| 310  | 211 | 212 | 213 | 214 | 215 | 216 | 217 |
| 320  | 218 | 219 | 220 | 221 | 222 | 223 | 224 |
| 330  | 225 | 226 | 227 | 228 | 229 | 230 | 231 |
| 340  | 232 | 233 | 234 | 235 | 236 | 237 | 238 |
| 350  | 239 | 240 | 241 | 242 | 243 | 244 | 245 |
| 360  | 246 | 247 | 248 | 249 | 250 | 251 | 252 |
| 370  | 253 | 254 | 255 | 256 | 257 | 258 | 259 |
| 380  | 260 | 261 | 262 | 263 | 264 | 265 | 266 |
| 390  | 267 | 268 | 269 | 270 | 271 | 272 | 273 |
| 400  | 274 | 275 | 276 | 277 | 278 | 279 | 280 |
| 410  | 281 | 282 | 283 | 284 | 285 | 286 | 287 |
| 420  | 288 | 289 | 290 | 291 | 292 | 293 | 294 |
| 430  | 295 | 296 | 297 | 298 | 299 | 300 | 301 |
| 440  | 302 | 303 | 304 | 305 | 306 | 307 | 308 |
| 450  | 309 | 310 | 311 | 312 | 313 | 314 | 315 |
| 460  | 316 | 317 | 318 | 319 | 320 | 321 | 322 |
| 470  | 323 | 324 | 325 | 326 | 327 | 328 | 329 |
| 480  | 330 | 331 | 332 | 333 | 334 | 335 | 336 |
| 490  | 337 | 338 | 339 | 340 | 341 | 342 | 343 |
| 500  | 344 | 345 | 346 | 347 | 348 | 349 | 350 |
| 510  | 351 | 352 | 353 | 354 | 355 | 356 | 357 |
| 520  | 358 | 359 | 360 | 361 | 362 | 363 | 364 |
| 530  | 365 | 366 | 367 | 368 | 369 | 370 | 371 |
| 540  | 372 | 373 | 374 | 375 | 376 | 377 | 378 |
| 550  | 379 | 380 | 381 | 382 | 383 | 384 | 385 |
| 560  | 386 | 387 | 388 | 389 | 390 | 391 | 392 |
| 570  | 393 | 394 | 395 | 396 | 397 | 398 | 399 |
| 580  | 400 | 401 | 402 | 403 | 404 | 405 | 406 |
| 590  | 407 | 408 | 409 | 410 | 411 | 412 | 413 |
| 600  | 414 | 415 | 416 | 417 | 418 | 419 | 420 |
| 610  | 421 | 422 | 423 | 424 | 425 | 426 | 427 |
| 620  | 428 | 429 | 430 | 431 | 432 | 433 | 434 |
| 630  | 435 | 436 | 437 | 438 | 439 | 440 | 441 |
| 640  | 442 | 443 | 444 | 445 | 446 | 447 | 448 |
| 650  | 449 | 450 | 451 | 452 | 453 | 454 | 455 |
| 660  | 456 | 457 | 458 | 459 | 460 | 461 | 462 |
| 670  | 463 | 464 | 465 | 466 | 467 | 468 | 469 |
| 680  | 470 | 471 | 472 | 473 | 474 | 475 | 476 |
| 690  | 477 | 478 | 479 | 480 | 481 | 482 | 483 |
| 700  | 484 | 485 | 486 | 487 | 488 | 489 | 490 |
| 710  | 491 | 492 | 493 | 494 | 495 | 496 | 497 |
| 720  | 498 | 499 | 500 | 501 | 502 | 503 | 504 |
| 730  | 505 | 506 | 507 | 508 | 509 | 510 | 511 |
| 740  | 512 | 513 | 514 | 515 | 516 | 517 | 518 |
| 750  | 519 | 520 | 521 | 522 | 523 | 524 | 525 |
| 760  | 526 | 527 | 528 | 529 | 530 | 531 | 532 |
| 770  | 533 | 534 | 535 | 536 | 537 | 538 | 539 |
| 780  | 540 | 541 | 542 | 543 | 544 | 545 | 546 |
| 790  | 547 | 548 | 549 | 550 | 551 | 552 | 553 |
| 800  | 554 | 555 | 556 | 557 | 558 | 559 | 560 |
| 810  | 561 | 562 | 563 | 564 | 565 | 566 | 567 |
| 820  | 568 | 569 | 570 | 571 | 572 | 573 | 574 |
| 830  | 575 | 576 | 577 | 578 | 579 | 580 | 581 |
| 840  | 582 | 583 | 584 | 585 | 586 | 587 | 588 |
| 850  | 589 | 590 | 591 | 592 | 593 | 594 | 595 |
| 860  | 596 | 597 | 598 | 599 | 600 | 601 | 602 |
| 870  | 603 | 604 | 605 | 606 | 607 | 608 | 609 |
| 880  | 610 | 611 | 612 | 613 | 614 | 615 | 616 |
| 890  | 617 | 618 | 619 | 620 | 621 | 622 | 623 |
| 900  | 624 | 625 | 626 | 627 | 628 | 629 | 630 |
| 910  | 631 | 632 | 633 | 634 | 635 | 636 | 637 |
| 920  | 638 | 639 | 640 | 641 | 642 | 643 | 644 |
| 930  | 645 | 646 | 647 | 648 | 649 | 650 | 651 |
| 940  | 652 | 653 | 654 | 655 | 656 | 657 | 658 |
| 950  | 659 | 660 | 661 | 662 | 663 | 664 | 665 |
| 960  | 666 | 667 | 668 | 669 | 670 | 671 | 672 |
| 970  | 673 | 674 | 675 | 676 | 677 | 678 | 679 |
| 980  | 680 | 681 | 682 | 683 | 684 | 685 | 686 |
| 990  | 687 | 688 | 689 | 690 | 691 | 692 | 693 |
| 1000 | 694 | 695 | 696 | 697 | 698 | 699 | 700 |

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A TABLE of the Sun's Semi-diurnal Arches, or Times of visible half Tarriance above the Horizon.

| The Sun's Declination North. |        |    |        |    |        |    |        |    |        |    |
|------------------------------|--------|----|--------|----|--------|----|--------|----|--------|----|
| Lat.                         | La. 49 |    | La. 50 |    | La. 51 |    | La. 52 |    | La. 53 |    |
|                              | h.     | m. | h.     | m. | h.     | m. | h.     | m. | h.     | m. |
| 0                            | 6      | 46 | 6      | 46 | 6      | 46 | 6      | 46 | 6      | 46 |
| 1                            | 6      | 8  | 6      | 8  | 6      | 8  | 6      | 9  | 6      | 9  |
| 2                            | 6      | 12 | 6      | 13 | 6      | 13 | 6      | 14 | 6      | 15 |
| 3                            | 6      | 16 | 6      | 18 | 6      | 18 | 6      | 19 | 6      | 19 |
| 4                            | 6      | 22 | 6      | 22 | 6      | 22 | 6      | 25 | 6      | 20 |
| 5                            | 6      | 26 | 6      | 27 | 6      | 28 | 6      | 29 | 6      | 31 |
| 6                            | 6      | 31 | 6      | 32 | 6      | 33 | 6      | 34 | 6      | 37 |
| 7                            | 6      | 36 | 6      | 37 | 6      | 38 | 6      | 40 | 6      | 43 |
| 8                            | 6      | 41 | 6      | 42 | 6      | 43 | 6      | 45 | 6      | 48 |
| 9                            | 6      | 46 | 6      | 47 | 6      | 48 | 6      | 51 | 6      | 55 |
| 10                           | 6      | 50 | 6      | 53 | 6      | 54 | 6      | 56 | 7      | 0  |
| 11                           | 6      | 55 | 6      | 57 | 6      | 59 | 7      | 1  | 7      | 6  |
| 12                           | 7      | 0  | 7      | 2  | 7      | 3  | 7      | 7  | 9      | 12 |
| 13                           | 7      | 5  | 7      | 7  | 7      | 10 | 7      | 12 | 15     | 18 |
| 14                           | 7      | 10 | 7      | 13 | 7      | 15 | 7      | 18 | 21     | 24 |
| 15                           | 7      | 15 | 7      | 18 | 7      | 21 | 7      | 24 | 27     | 32 |
| 16                           | 7      | 20 | 7      | 24 | 7      | 27 | 7      | 31 | 32     | 37 |
| 17                           | 7      | 26 | 7      | 29 | 7      | 33 | 7      | 36 | 40     | 44 |
| 18                           | 7      | 31 | 7      | 34 | 7      | 38 | 7      | 42 | 46     | 51 |
| 19                           | 7      | 37 | 7      | 41 | 7      | 44 | 7      | 49 | 53     | 58 |
| 20                           | 7      | 43 | 7      | 47 | 7      | 51 | 7      | 55 | 8      | 5  |
| 21                           | 7      | 49 | 7      | 53 | 7      | 57 | 8      | 3  | 8      | 11 |
| 22                           | 7      | 55 | 7      | 59 | 8      | 4  | 8      | 9  | 15     | 20 |
| 23                           | 8      | 1  | 8      | 6  | 8      | 12 | 8      | 17 | 22     | 28 |
| 23½                          | 8      | 4  | 8      | 9  | 8      | 15 | 8      | 20 | 26     | 32 |

By these Tables the Times of the Sun's Rising and Setting may be found, in any Part of the Kingdom of Great Britain or Ireland, after the following Manner: When the Latitude of the Place is known, take the Sun's Declination

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TABLE of the SUN's Semi-diurnal Arches, or Times of his visible half Tarriance above the Horizon.

| The SUN's Declination South. |        |    |        |    |        |    |        |    |        |    |        |    |
|------------------------------|--------|----|--------|----|--------|----|--------|----|--------|----|--------|----|
| Degr.                        | La. 49 |    | La. 50 |    | La. 51 |    | La. 52 |    | La. 53 |    | La. 54 |    |
|                              | h.     | m. | h.     | m. | h.     | m. | h.     | m. | h.     | m. | h.     | m. |
| 0                            | 6      | 46 | 46     | 46 | 46     | 46 | 46     | 46 | 36     | 4  |        |    |
| 1                            | 5      | 59 | 5      | 59 | 5      | 58 | 5      | 58 | 5      | 58 | 5      | 58 |
| 2                            | 5      | 54 | 5      | 54 | 5      | 53 | 5      | 53 | 5      | 53 | 5      | 53 |
| 3                            | 5      | 49 | 5      | 49 | 5      | 49 | 5      | 49 | 5      | 49 | 5      | 47 |
| 4                            | 5      | 45 | 5      | 45 | 5      | 45 | 5      | 43 | 5      | 42 | 5      | 41 |
| 5                            | 5      | 41 | 5      | 39 | 5      | 39 | 5      | 38 | 5      | 37 | 5      | 36 |
| 6                            | 5      | 35 | 5      | 35 | 5      | 34 | 5      | 33 | 5      | 32 | 5      | 30 |
| 7                            | 5      | 31 | 5      | 30 | 5      | 29 | 5      | 27 | 5      | 26 | 5      | 25 |
| 8                            | 5      | 26 | 5      | 25 | 5      | 23 | 5      | 21 | 5      | 21 | 5      | 20 |
| 9                            | 5      | 21 | 5      | 20 | 5      | 18 | 5      | 17 | 5      | 16 | 5      | 13 |
| 10                           | 5      | 17 | 5      | 14 | 5      | 14 | 5      | 11 | 5      | 10 | 5      | 8  |
| 11                           | 5      | 13 | 5      | 10 | 5      | 8  | 5      | 6  | 5      | 4  | 5      | 2  |
| 12                           | 5      | 7  | 5      | 5  | 5      | 3  | 5      | 0  | 4      | 5  | 4      | 56 |
| 13                           | 5      | 2  | 5      | 0  | 4      | 5  | 4      | 5  | 4      | 5  | 4      | 51 |
| 14                           | 4      | 57 | 4      | 54 | 4      | 50 | 4      | 49 | 4      | 47 | 4      | 41 |
| 15                           | 4      | 52 | 4      | 49 | 4      | 40 | 4      | 44 | 4      | 41 | 4      | 37 |
| 16                           | 4      | 46 | 4      | 45 | 4      | 42 | 4      | 38 | 4      | 34 | 4      | 31 |
| 17                           | 4      | 41 | 4      | 38 | 4      | 35 | 4      | 32 | 4      | 28 | 4      | 23 |
| 18                           | 4      | 36 | 4      | 32 | 4      | 29 | 4      | 26 | 4      | 22 | 4      | 18 |
| 19                           | 4      | 31 | 4      | 23 | 4      | 23 | 4      | 19 | 4      | 14 | 4      | 12 |
| 20                           | 4      | 25 | 4      | 20 | 4      | 17 | 4      | 14 | 4      | 9  | 4      | 4  |
| 21                           | 4      | 19 | 4      | 15 | 4      | 11 | 4      | 6  | 4      | 2  | 3      | 57 |
| 22                           | 4      | 13 | 4      | 9  | 4      | 4  | 4      | 0  | 3      | 5  | 3      | 50 |
| 23                           | 4      | 7  | 4      | 3  | 3      | 57 | 3      | 53 | 3      | 47 | 3      | 42 |
| 23½                          | 4      | 4  | 4      | 0  | 3      | 55 | 3      | 50 | 3      | 34 | 3      | 38 |

ation out of the Table, on the Noon of the Day you  
 fire to know the Time of his Rising and Setting, and  
 with it, according as it is either North or South, enter these  
 Tables in the Left-hand Column, under the Word Degrees;  
 then

*A TABLE of the SUN'S Semi-diurnal Arches, or Times of visible half Trarriance above the Horizon.*

| The SUN'S Declination North. |       |       |       |       |       |       |
|------------------------------|-------|-------|-------|-------|-------|-------|
| Lat.                         | 55    | 56    | 57    | 58    | 59    | 60    |
| h. m.                        | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. |
| 0                            | 6 4   | 6 4   | 6 4   | 6 4   | 6 4   | 6 4   |
| 1                            | 6 9   | 6 10  | 6 10  | 6 10  | 6 11  | 6 11  |
| 2                            | 6 15  | 6 16  | 6 16  | 6 17  | 6 17  | 6 18  |
| 3                            | 6 20  | 6 22  | 6 23  | 6 23  | 6 24  | 6 25  |
| 4                            | 6 26  | 6 28  | 6 29  | 6 30  | 6 31  | 6 31  |
| 5                            | 6 32  | 6 35  | 6 35  | 6 36  | 6 38  | 6 39  |
| 6                            | 6 38  | 6 40  | 6 41  | 6 43  | 6 44  | 6 46  |
| 7                            | 6 44  | 6 46  | 6 48  | 6 49  | 6 51  | 6 53  |
| 8                            | 6 50  | 6 52  | 6 55  | 6 58  | 6 56  | 6 57  |
| 9                            | 6 56  | 6 58  | 6 57  | 6 57  | 6 57  | 6 58  |
| 10                           | 7 3   | 7 5   | 7 7   | 7 10  | 7 13  | 7 16  |
| 11                           | 7 8   | 7 10  | 7 14  | 7 17  | 7 20  | 7 23  |
| 12                           | 7 15  | 7 18  | 7 22  | 7 24  | 7 27  | 7 31  |
| 13                           | 7 21  | 7 24  | 7 28  | 7 31  | 7 35  | 7 39  |
| 14                           | 7 28  | 7 31  | 7 35  | 7 38  | 7 43  | 7 47  |
| 15                           | 7 34  | 7 39  | 7 42  | 7 46  | 7 51  | 7 56  |
| 16                           | 7 41  | 7 45  | 7 49  | 7 54  | 7 59  | 8 4   |
| 17                           | 7 49  | 7 52  | 7 57  | 8 2   | 7 7   | 7 13  |
| 18                           | 7 55  | 7 58  | 7 54  | 8 10  | 7 16  | 7 22  |
| 19                           | 8 2   | 7 58  | 8 13  | 8 19  | 7 25  | 7 32  |
| 20                           | 8 10  | 8 15  | 8 21  | 8 28  | 8 35  | 8 42  |
| 21                           | 8 18  | 8 24  | 8 30  | 8 37  | 8 45  | 8 53  |
| 22                           | 8 26  | 8 32  | 8 39  | 8 47  | 8 55  | 9 4   |
| 23                           | 8 34  | 8 41  | 8 50  | 8 57  | 9 6   | 9 10  |
| 23 1/2                       | 8 39  | 8 46  | 8 54  | 9 2   | 9 12  | 9 17  |

then look for the Latitude of the Place in the Top of the Table; and in that Column, against the Sun's Declination will be found the Time of his visible half Trarriance above the Horizon, or Time of his Setting, correct by Refraction

TABLE of the SUN's Semi-diurnal Arches, or Times of his  
visible half Terriance above the Horizon.

| The Sun's Declination South. |        |    |        |    |        |    |        |    |        |    |        |    |
|------------------------------|--------|----|--------|----|--------|----|--------|----|--------|----|--------|----|
| Lat.                         | La. 55 |    | La. 56 |    | La. 57 |    | La. 58 |    | La. 59 |    | La. 60 |    |
|                              | h.     | m. | h.     | m. | h.     | m. | h.     | m. | h.     | m. | h.     | m. |
| 0                            | 6      | 46 | 6      | 46 | 6      | 46 | 6      | 46 | 6      | 46 | 6      | 46 |
| 1                            | 5      | 58 | 5      | 58 | 5      | 58 | 5      | 58 | 5      | 57 | 5      | 57 |
| 2                            | 5      | 52 | 5      | 52 | 5      | 52 | 5      | 51 | 5      | 51 | 5      | 50 |
| 3                            | 5      | 47 | 5      | 46 | 5      | 45 | 5      | 45 | 5      | 44 | 5      | 43 |
| 4                            | 5      | 40 | 5      | 40 | 5      | 39 | 5      | 30 | 5      | 36 | 5      | 37 |
| 5                            | 5      | 35 | 5      | 34 | 5      | 33 | 5      | 32 | 5      | 31 | 5      | 29 |
| 6                            | 5      | 29 | 5      | 28 | 5      | 27 | 5      | 25 | 5      | 24 | 5      | 22 |
| 7                            | 5      | 23 | 5      | 22 | 5      | 20 | 5      | 19 | 5      | 17 | 5      | 15 |
| 8                            | 5      | 17 | 5      | 16 | 5      | 14 | 5      | 12 | 5      | 10 | 5      | 8  |
| 9                            | 5      | 12 | 5      | 10 | 5      | 8  | 5      | 5  | 5      | 3  | 5      | 1  |
| 10                           | 5      | 5  | 5      | 3  | 5      | 1  | 4      | 59 | 4      | 56 | 4      | 53 |
| 11                           | 4      | 59 | 4      | 57 | 4      | 54 | 4      | 52 | 4      | 49 | 4      | 46 |
| 12                           | 4      | 53 | 4      | 51 | 4      | 48 | 4      | 45 | 4      | 42 | 4      | 38 |
| 13                           | 4      | 47 | 4      | 44 | 4      | 41 | 4      | 38 | 4      | 34 | 4      | 30 |
| 14                           | 4      | 41 | 4      | 37 | 4      | 34 | 4      | 30 | 4      | 27 | 4      | 23 |
| 15                           | 4      | 34 | 4      | 31 | 4      | 27 | 4      | 23 | 4      | 19 | 4      | 14 |
| 16                           | 4      | 27 | 4      | 24 | 4      | 20 | 4      | 15 | 4      | 11 | 4      | 6  |
| 17                           | 4      | 21 | 4      | 17 | 4      | 12 | 4      | 8  | 4      | 3  | 3      | 57 |
| 18                           | 4      | 14 | 4      | 9  | 4      | 5  | 4      | 0  | 3      | 54 | 3      | 45 |
| 19                           | 4      | 7  | 4      | 2  | 4      | 56 | 4      | 51 | 3      | 44 | 3      | 39 |
| 20                           | 3      | 59 | 3      | 54 | 3      | 49 | 3      | 43 | 3      | 36 | 3      | 29 |
| 21                           | 3      | 52 | 3      | 46 | 3      | 40 | 3      | 34 | 3      | 27 | 3      | 19 |
| 22                           | 3      | 44 | 3      | 38 | 3      | 31 | 3      | 25 | 3      | 17 | 3      | 9  |
| 23                           | 3      | 36 | 3      | 29 | 3      | 23 | 3      | 13 | 3      | 6  | 2      | 57 |
| 23 1/2                       | 3      | 31 | 3      | 24 | 3      | 18 | 3      | 10 | 2      | 1  | 2      | 50 |

Abstract the Time of his Setting from 12 Hours, the  
Residue will be the Time of his Rising; double the  
Time of his Setting, the Sum will be the Length of the  
Day; and double the Time of his Rising, the Sum will be the  
Length



Length of the Night. But if the Latitude of the Place, and Declination of the Sun, consist of Degrees and Minutes, a small Allowance must be made for the Minutes in both Cases, which may be done by a Person of an ordinary Capacity, by a mental Proportion only. Thus to find the Time of the Sun's Rising and Setting at Aberdeen in Scotland, on the longest Day, the Latitude of that Place is counted 57 Deg. 7 Min. North, and the Sun's Declination 23 Deg. 29 Min. likewise North. By these you will find by the Table, that 4 Min. for the Sun's Declination, and 1 Min. for the Latitude of the Place, are both to be added to 8 Hours, 50 Min. the Time belonging to 57 Deg. Latitude, and 23 Deg. of North Declination, and the Sum will be 8 Hours, 55 Min. the Time of his apparent Setting at Aberdeen, on the longest Day, whose Complement to 24 Hours, viz. 3 Hours, 5 Minutes, will be the Time of Rising, &c.



#### Explanation of the Terms used in GEOGRAPHY.

**T**HE Word Geography comes from the Greek, and signifies a Description of the Earth. By the Earth is to be understood the great Globe composed of the Earth and Water, and called the Terrestrial Globe.

Chorography is the Description of a Province or County, as Yorkshire.

Topography, the Description of a particular Place, Town, City, &c.

Hydrography is a Description of the Water, particularly of the Sea.

Maps may be divided into general and particular. The whole World is generally represented in two Planispheres, though sometimes in a Chart, according to Mercator's projection. This is the most general Map. The Maps of Europe, of Asia, Africa, and America, are likewise general Maps. Likewise the Map of England may be so called with regard to the Counties of which it consists. Particular Maps represent particular Counties, Provinces, or Countries.

Geography, like other Sciences, has certain Terms proper to itself, and which it will be necessary to explain. There are two Sorts; some regard the EARTH, and some respect the WATER. Those that regard the EARTH are

Terra-firma, or the Continent, which is a great Part of the Earth, comprehending several Countries, not separated from the Sea. Thus Europe is a Continent.  
An Island, or Isle, is a Portion of the Earth, intirely surrounded with Water. A Peninsula, or Chersonese, is Land almost surrounded with Water, and is connected to the Continent by a Neck of Land. An Isthmus is a Neck of Land inclosed by two Seas, and serves to unite the Continent to the Peninsula.

A Promontory is a Part of the Earth which advances into the Sea; when it rises like a Mountain, it is called a Cape, but when the Elevation is inconsiderable, it is called a Point.

Downs are hilly Plains, or Hills consisting of Sand and Gravel. This Word is often taken for a Part of the Sea lying near the Sand Banks on the Coast of Kent. Some take them for Sand-Hills on the Sea-Coasts, which serve as a Barrier to the Sea; but if this were the Sense, what would become of Banstead-Downs, Marlborough-Downs, &c.

A Mountain is a Part of Land rising greatly above the Plain.

The WATER is divided into six Parts, Oceans, Seas, Gulphs, Straits, Lakes, and Rivers.

An Ocean is a large Collection of Waters, surrounding and environing a considerable Part of the Continent, as the Northern and Atlantic Oceans.

A Sea is a less Collection of Waters, or Part of an Ocean, as the British Sea, and the Irish Sea.

A Gulph is surrounded with Land except in one Part, where it communicates with the Sea or Ocean, as the Mediterranean, the Gulph of Venice, the Baltic, and the Black Sea.

A Strait is a narrow Passage between two Seas, as the Straits of Gibraltar.

A Lake is a Collection of Standing Water, surrounded by Land and having no Communication by Sea, as the Lake of Geneva, the Lake Aral, and the Caspian Sea, which is properly a Lake.

A River is a Stream of fresh Water, which runs thro' the Land from its own Spring, till it falls into the Sea. However, these Streams generally rise from different Sources, and are at first called Brooks or Rivulets, and run into larger Streams, which are properly called Rivers.



*The general Division of the EARTH and SEA.*

**T**HE Terrestrial Globe may be divided into two Parts, the Earth and the Sea. The Earth may be divided into known and unknown Lands. The latter includes such Parts as are yet undiscovered, of which there are doubtless many; as also those that are but partly known by visiting the Coast. The known Land is divided into two great Continents, the Old containing Europe, Asia, and Africa, and the New containing America.

EUROPE has Denmark, Norway, Sweden, Muscovy, Russia, towards the North; France, Germany, Poland, Bohemia, and Hungary, about the Middle; Spain, Portugal, Italy, and Turkey in Europe, on the South.

ASIA has that Part of Russia next to Europe and Tartary belonging to the Muscovites in the North, Turkey, Asia, Persia, Great Tartary and China, about the Middle, and Arabia, the Mogul's Country; and the Peninsulas on both Sides the Ganges in the South.

AFRICA has Barbary, Egypt, Nigritia, Guinea, Nubia, Abyssinia, &c. on this Side the Equator; and Congo, Zanzibar, Monoemugi, Monomotapa, and the Hottentots beyond it.

AMERICA is divided into the North and South. The North contains New France, Nova Scotia, New England, Maryland, Pennsylvania, Virginia, Carolina, Georgia, Mexico, and California. The South contains Terra delima, Peru, Brasil, the Land of the Amazons, Paraguay, Chili and Terra Magellanica.

The Islands of Europe in the Ocean are Great Britain, Ireland, Iceland, and the Islands of the Baltic. In the Mediterranean are Majorca and Minorca, Malta, Sicily, Sardinia, Corsica, Candy, Corfu, and the Islands of the Archipelago.

The Islands of Asia in the Ocean are the Maldives, Ceylon, Sumatra, Java, Borneo, called the Isles of Sun-  
da; the Moluccas, the Philippines, the Isles of Japan  
and Formosa. Add to these the Isle of Cyprus in the Me-  
diterranean, and Rhodes.

The Islands of Africa are the Canaries, the Islands of  
Madeira, the Cape De Verd Islands, St Thomas, Ascen-  
sion, St. Helena, &c. all these lie on the West. On the  
East are the Isles of Madagascar, Comorro, and Bourbon;  
with a great many small ones on the Coast of Zanzibar.  
Likewise Zocotora, on the Arabian Coast, near Cape  
Guardafui.

The Islands of America on the East, are those of Fer-  
nando de Naronha, near the Coast of Brasil; and Saxem-  
berg, Pepys, and Malouinies off the Magellanic Coast.  
On the West Coast near Peru lie those of Cocos and the  
Gallopegas. On the Coast of Chili, St. Felix, and Juan  
Fernandez. And farther in the Ocean the Isles of St.  
Paul, of the Marquis of Mendoza, Fernando Quiros and  
Solomon. The Isles on the South are those of Terra del  
Fuego, including the Islands Van Staten. On the East  
the lesser Isles of the Straits of Magellan. On the North  
and East Side are Newfoundland, Bermudas, the Lucayas  
Bahama Islands. The Antilles or Caribbee Islands,  
and many others.

The SEA is divided into the Exterior, or that which sur-  
rounds the Continent and the Interior, or that which is  
contained within the Continent. The former is divided  
into 1. The North or Frozen Ocean; 2. The India Sea  
Ocean; 3. The Oriental Ocean; 4. The Western  
Ocean; 5. The Southern Ocean; 6. The Great South  
Sea, or Pacific Ocean.

The Seas within the Continent are the Mediterranean,  
the Baltic, the White Sea or Gulph of Russia; the Black  
Euxine Sea; the Sea of Zabach, or the Sea of Azoph,  
formerly called Palus Mæotis, near the Black Sea; the Sea  
Marmora, otherwise called the Propontis; the Caspian  
Sea, which is properly only a Lake; the Red Sea, or the  
Arabian Gulph; the Persian Gulph between Arabia and  
Persia; the Vermillion Sea near California; the Gulph of  
Lawrence, near Newfoundland; the Gulph of Mexico;  
the Sea of Koreo, and the Sea of Kamschatka.

Of the principal Isthmuses, Gulphs, Straits, Lakes  
Rivers.

**A**N ISTHMUS is a Part of the Earth shut in between two Seas, and joins one Land to another, of which there are two very considerable in Europe, viz. the Isthmus of Corinth, which joins the Morea to Greece, and the Isthmus of Precop, which unites Little Tartary with the Crimea.

The most remarkable Isthmus in Asia is that of Tericerim, which joins the Peninsula of Malacca with the Kingdom of Siam. In Africa there is likewise only one, that is the Isthmus of Suez, which unites Asia with Africa. They formerly attempted to make a Canal from one Sea to the other; but the Design miscarried. In America there is the Isthmus of Panama, which separates North America from the South.

The Ocean forms eight remarkable Gulphs. There are three in Europe, which have the Name of Seas; the Mediterranean, the Baltic Sea, and the White Sea. There are three in Asia, the Gulph of Bengal, the Persian Gulph, and the Arabian Gulph or Red Sea. There are two in America, the Gulph of California or the Vermillion Sea.

The most famous Straits are Hudson's Straits in the North Part of America, and the Straits of Magellan in the South. The lesser Straits are those of Gibraltar, between Africa and Europe, and which permit the Ocean to enter into the Mediterranean: The Straits of Babelmandley, between Asia and Africa, and which join the Red Sea to the Ocean: The Straits called the Sound, which unite the Baltic with the German Ocean.

The most famous Lakes are the Ladoga and Onega, at the Confines of Muscovy. The Caspian Sea; to the West of which lies the Lake Aral, but lately known to be of great Extent, and seems to be mistaken by some for the Caspian Sea; the Lake Baikal; these last are in Asia. There are also several Lakes in North America, of which the superior or upper Lake is the principal.

The principal Rivers in Europe are the Thames in England, the Torneo in Sweden, at the Bottom of the Gulf



Bothnia; the Volga in Russia, which runs into the Caspian Sea; the Danube, which rises in Germany and runs thro' Turkey in Europe into the Black Sea; the Don or Tanais in Russia, which runs into the Sea of Azoph; the Nieper which rises in Poland, and empties itself into the Black Sea; the Rhine in Germany; the Loire in France; the Po in Italy; and the Tagus in Spain.

In Asia there is the Euphrates, which rises in the Mountains of Armenia, and runs on the East Side of the Deserts of Arabia, till it comes to the Place where Babylon formerly stood, and uniting itself with the Tigris soon after it passes by Basra and falls into the Persian Gulph; the Tigris, which has its Source a little lower, and running towards the South passes by Mosul and Bagdad, after which it unites its Stream with the former, and empties itself into the Persian Gulph; the Indus, this runs from North to South, dividing Persia from the Mogul's Country, and falls into the Indian Ocean; the Ganges likewise runs from North to South on the East Side of the Mogul's Country, and falls into the Gulph of Bengal. The chief Rivers in China are the Kan-ho or the Yellow River, and the Kyang-tse or the Yang-tse Kyang, both which run thro' the Country from West to East. The chief Rivers in Siberia are the Obi, the Obi, the Tobol, the Jenisca, and the Selinga; and the principal in Great Tartary is the Segalian.

The chief Rivers in Africa are the Nile, the Gambia, the Senega, and the Zaire. The Nile rises in the Mountains of Abyssinia, and runs from South to North through Ethiopia and Egypt into the Mediterranean. The excessive rains in the South Parts cause it to overflow the low Parts of Egypt once a Year, which renders it a very plentiful Country for Corn.

There are two considerable Rivers in North America, the River of St. Laurence, and the Mississipi, besides many others, which are navigable, in our English Plantations.

In South America the River of the Amazons, which is supposed to be the greatest River in the World, and the River of the Guay or la Plata.

*Of the different Religions of the World, and their Extent.*

**A**LL the Religions in the World may be reduced to four, the Pagan, Jewish, Christian, and Mahometan, to which some add the Natural.

The Pagan Religion is owing to the Inventions of Men and consists of various Kinds of Idolatry, and extravagant Opinions; it teaches the worshipping of Images, various Sacrifices, the Agency of Demons, and many other superstitious Practices. This was the Religion of the ancient Greeks and Romans, the People of America, and various other Parts. It is now extended over half Asia, five or six Parts of Africa, and nineteen in twenty of America.

The Persians formerly worshipped the Sun and Fire, but since Mahometanism is become the prevailing Faith, there are but few who profess this ancient Religion. However, some are established on the Borders of the Countries near to Persia, and in the Peninsula on this Side the Ganges. Nevertheless these Idolaters pretend they believe in one God, and that the Fire is his Image. They are called Gaurs or Gebres.

The Religion of the Brachmans was formerly the principal in the Mogul's Country, and in the Peninsula on this Side the Ganges, even till Mahometanism was established. It is now mostly cultivated by the natural Inhabitants. It is still prevalent in the other Dominions of this Peninsula, and in the Countries of the Rayas, who keep the Ground against the Mogul. These Rayas are little Sovereign Princes, who do Homage to the Great Mogul, and pay him Tribute.

The Brachmans or Gymnosophists were very severe Philosophers, who, according to Porphyry, made Profession of a kind of Monastic Life. The Bramins who succeed them are Indian Priests, who are of the ancient Religion of the Banians, who are Idolaters of the Indies. They believe the Transmigration of Souls. The Bramins and all their Followers have a great Veneration for a Cow, and they think themselves happy when they die holding one of their Tails.

The Chinese, in general, acknowledge no other God at Heaven. However, there are several Sects among them. That which is called the learned Sect, though they pay no regard to Idols, are said to pay a Homage to the Sun, Moon, and Stars. Others have Idol Temples, and both one and the other have a great Regard for Confucius.

The most extensive Form of Religion is that of Fo, for it prevails over Thibet, all the Western Tartary, as well as China, and most of the Indian Islands. It pretends to Revelation, and teaches all the Superstitions above mentioned.

The Worship of the Sun before Christianity, was of all Religions the most general; it was even found in America, for the People of Peru worshipped the Sun, as also those of Florida; and some in New Mexico worship him till this day. Some other Nations of America are thought to adore some imaginary Demon, and to use Conjurations by such Means; but however Travellers may have been imposed upon by their fantastic Ceremonies, there are now very few in Protestant Countries, who believe any Thing of these diabolical Stories.

The Jewish Religion has its Name from the Jews, a People of Syria in Africa, and was instituted by Moses about 3198 Years ago. It was intended to restore natural Religion, then decayed in the World. It consists chiefly in the Belief of one God: But the Jews were such a stubborn unbelieving Race of Mortals, that no Miracles could prevent them from relapsing into Idolatry, till they had endured the Babylonish Captivity, after which they seem to be pretty firm in their Belief, till they were divided into various Sects. The abstaining from Hog's Flesh was probably a temporary Law given to them, because it is bad for the Leprosy. But they strictly adhering to the better, hold it in the utmost Abhorrence even at this day. It is now the prevailing Religion of no Country, the Jews being no longer a Nation, but scattered over all Parts of the Earth: But more particularly Europe, the South Part of Asia, and the North Part of Africa, where they are very numerous.

The Christian Religion takes its Name from Jesus Christ, who was born in Judea 1763 Years ago, and was crucified

as a Malefactor, about the Age of 33, for teaching his Doctrines. It abolishes the Jewish Priesthood, and changes the Day of Worship from Saturday to Sunday. The moral Part of it surpasses all other Religions in the World, it being the highest Improvement of the Law of Nature. Christianity extends almost all over Europe and several Parts of America, as the established Religion where the Europeans have any Possession, and it is professed by different People in the Turkish Dominions, and is dispersed through several Regions of Asia and Africa. But it is so degenerated in many Places, that there remains nothing but the Name, particularly in Abyssinia, Armenia, and the Countries to the East of the Black Sea. In Europe it is divided into three principal Branches, the Roman Catholic, the Greek Church, and the Protestants. The Greeks are divided into three Sects, those that have renounced the Supremacy of the Pope of Rome, those that are Jacobites, Cophites or Eutychians, and those that are Nestorians. The Protestants are divided into several Branches, the Lutheran, the Episcopal, the Calvinist, the Presbyterian, the Baptist, Quakerism, and Socinianism, and many other Sects of lesser Note.

The Mahometan or Mahomedan is derived from Mahomet an Arabian, who published it as a Revelation 622 Years after Christ, and by Means thereof became Sovereign of Arabia. This Religion differs very little from that of the Jewish, except in acknowledging Mahomet to be the Prophet of God, their frequent Ablutions and other Ceremonies. They have changed the Day of Worship from Saturday to Friday.

Mahometanism is the chief Religion in the Turkish Empire, and the only one in Arabia. It is spread all over Persia, the Mogul's Empire, and many of the Indian Islands on the Northern and Eastern Coasts of Africa, with many of the inland Countries. Some affirm it six Times more extended than Christianity. However it has not penetrated into America.

*of the different Languages, and the different Colours, of the Inhabitants of the Earth.*

THE most general Languages are the Latin, the Teutonic, the Celtic or Keltic, the Slavonian, the Greek, the Turkish, the Eastern Syriac, the Arabic, the Tartarian, the Manchew, the Chinese, the Malayan, the Ethiopic. As for the Languages of Africa and America, they are so many it would be a great Labour to reckon them up.

As to the Extent of these Languages, the Latin is a dead Language; but the Italian is a Corruption of it as well as the Spanish and French. The Teutonic Language is spoken in Germany and Scandinavia. The English is a Mixture of Latin, Teutonic, and Norman. The Danish, Dutch, Flemish, and Swedish, are derived from the German.

The Slavonian has produced the Dalmatian, Bosnian, Albanian, Servian, Pulgarian, Moldavian, Bohemian, Silesian, the Polish, Russian, Mingrelian, and Circassian. The Turkish prevails over Turkey, and a great Part of the Eastern Tartary. The Eastern Syriac or Chaldaic is the Mother of the Western Syriac, the Hebrew, the Arabic, and the Abyssinian Languages. The Malayan prevails over a great Part of the farther Indies and the Islands. The Chinese is spoken throughout China. The Manchew prevails in Eastern Tartary. The Celtic seems to be the original and most general Language of Europe. It is still preserved in Wales, Bretagne, and the North of Scotland, and particularly in Ireland.

The Greek made a Progress wherever that Empire prevailed. It is now spoken in the South Part of Turkey in Europe, that is in ancient Greece, the Islands of the Archipelago, and Natolia, but much corrupted.

The COLOURS of the Inhabitants of the Earth are four,

1. White; 2. Tawny; 3. Black; and 4. Red.

The Inhabitants of Europe are White, as well as Part of the Asiatics, that is Natolia, Armenia, Georgia, the Northern Provinces of Persia, and about the Caspian Sea, Grand Tartary, and the Northern Parts of China.

The



The Tawny or Brown inhabit a great Part of Barbary, Egypt, Zara, Zanguebar. In Asia they dwell in Syria, Diarbeker, Arabia, the Southern Parts of China, the Islands of Ceylon, the Maldives, Sunda, the Moluccas, and the Philippines; the Indians are of this yellowish tawny, and those that are more brown, are only made so by the scorching Heat of the Sun.

The Inhabitants of Africa are generally Black, except those first mentioned; so likewise are those of some Parts of Asia, New Guinea, and New Holland. The Americans are Red from one End of that vast Continent to the other; and if they appear in a more dusky Complexion in some Parts, it is because they daub themselves with Bear's Grease and other unctious Substances.

Mankind differ much in their Figure and Shape; they are generally reduced to four Kinds; the Europeans have a particular Aspect well known to all. But out of these we must except Little Tartary and the North Part of Russia. However, the Inhabitants of Barbary have Features not unlike those of the People of Europe; as also Turkey in Asia, and the Indians on this Side the Ganges have some Resemblance.

The second Sort are the Chinese, the Tartars, the Inhabitants of the Peninsula beyond the Ganges, the Islands of Japan, the Philippines, the Moluccas and the Isles of Sunda; these have flat Noses, the Visage extremely flat, and the Eyes oval or narrow.

The third Kind comprehends the Laplanders and the Samayoids, who are long-visaged, frightful, and have somewhat of the Aspect of a Bear.

The fourth are the Blacks of Africa, who have woolly Heads, flat Noses, and thick Lips; their Tongues, and the Inside of their Mouths, are as Red as Coral.

The fifth are the Americans, who are without Beards and without Hair on any Part of their Bodies except the Head, where it is long and black, when they will suffer it to grow; they go generally naked, some quite so, and others only cover those Parts which Decency requires them to hide. It is the same in Africa from Cape de Verde to the Cape of Good Hope, in the new discovered Countries to the South, and many other Places of the World.

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I know many Authors have asserted, that the Americans pull up their Beards by the Roots, in which they only copy one another; but who can imagine that in such a vast Country as America, all the People, with one Consent, should agree to pluck out their Beards? Besides, it is no very easy Matter; and those who think otherwise, had best try. However, as I have had an Opportunity to observe them, I can affirm the contrary. Besides, La-Fonton, who lived among them, declares the same, as well as Charlevoix, who travelled quite through North America.

It has greatly puzzled the Learned to know by what Means America came to be peopled. Some have affirmed they came from Phœnicia, because they worship the Sun, and others have imagined they are derived from China. But this would be wonderfully strange, because the Chinese deal much in Words of one Syllable, and the Americans have Words of a prodigious Length. As for Instance, near the River of the Amazons, the Word Poettarrorin-bouroac signifies three; which is the highest Number their Arithmetic arrives at, otherwise what a Trouble it would be to tell Twenty. Their Languages indeed are various, but none of them, that we know of, have any Analogy with those of the old World. Besides, had People come Volunteers into America, they would certainly have taken some useful Animals along with them; for before the Conquest of America, by the Spaniards, there were no Horses, Cows, Sheep, Hogs, Asses, &c. which are in plenty elsewhere. But they had many Creatures, which are not to be found in any other Part of the World. Some say they have Lions, but this is only taken from Report, for no Eye-Witness can be produced, who has ever seen any. The Consideration of these Things influenced Charlevoix to affirm America was peopled by the Grand-Children of Noah: And the present Bishop of Clogher believes it was inhabited before the Flood, and that the People were saved by the peculiar Care of Divine Providence; others have asserted, that these White, Brown, Red, and Black People must all have had different Parents originally, and created at different Times; but this is contrary to the Holy Scriptures, which make Adam and Eve to be the first Parents of all Mankind. But those who believe

believe there were Men before Adam, from Cain's going to dwell in the Land of Nod, which seemed full of Inhabitants, will make no Scruple to subscribe to this Opinion.



## Of EUROPE.

**E**UROPE is the least Part of the World of the four; but it is the principal with regard to the Number of the Inhabitants, its Riches, its Arts and Sciences, and the Number of Learned Men it has produced.

Europe is separated from Africa by the Mediterranean Sea; from America by the Sea formerly called the Atlantic Ocean; from the unknown Northern Lands by the Frozen or Icy Sea; from Asia by the Archipelago, by the Black Sea, by the River Don, and by a Line drawn from the Mouth of the River Obi, in the Scythian Ocean, to the Elbow made by the River Don before it falls into the Sea of Azoph. It is 2208 Marine Miles in Length from Cape Vincent in Spain, to the Mouth of the River Obi in Russia, and 2160 broad from the Cape of Norway in the North to Cape Matapan in the South.

Europe is divided into eleven great Parts, including the Dependencies: 1. Swedeland, 2. Denmark and Norway, 3. Russia, 4. Poland, 5. Germany, 6. France, 7. Spain, 8. Italy, 9. Turkey in Europe, 10. Little Tartary, 11. The European Islands, the chief of which are Great Britain and Ireland.

The Religions of Europe are the Jewish, the Mahometan, and the Christian. The Jewish is professed by the Jews living in these Parts. The Mahometan or Mahomedan is the Religion of Turkey, Little Tartary, and some Parts of Russia.

The Christian is divided into the Greek, the Roman, and the Protestant Churches. The Tenets of the Roman Church are, 1. Transubstantiation, or the Change of the Sacramental Wafer into the very Body of Christ, assuming the Form of a Wafer; which they first worship and then swallow. 2. That it is infallible, the only true Church, and that out of it is no Salvation. 3. That the Pope is the Vicar of Christ, and the only Head of the Church.

Christian Church. 4. That the Scriptures are not sufficient for Salvation without Tradition. 5. That the Sacramental Cup ought not to be given to the Laity. 6. That the Pope can dissolve the most solemn Oaths. 7. That those that dissent from them be persecuted, and that no Faith to be kept with Heretics. 8. They pray to Saints, and to the Dead. 9. They believe a Purgatory.

The Protestants, as was before observed, are divided into several Sects, but they all agree to reject the Errors and Impieties of the Church of Rome; the Ground of their Religion is the Scripture only. They declare Persecution unlawful, but are very apt to practise it when in Power.

The Greeks acknowledge the Primacy of the Patriarch of Constantinople in Opposition to the Pope; they hold no Purgatory; they adore no Images; they will not allow Transubstantiation; they administer both Bread and Wine, and deem the Papists Schismatics.

The Protestant Religion is establish'd in Great-Britain and Ireland, Denmark, Sweden, Norway, Prussia, the United Provinces, Switzerland, and Part of Germany. It is professed by some in France, Poland, Hungary, and Part of Germany, where Popery prevails. The Popish Religion is establish'd in Spain, Portugal, Italy, France, the Netherlands, Poland, and Part of Germany: There are some Papists in Great-Britain, and many in Ireland. The Greek Religion is establish'd in Russia, Walachia, Moldavia, and is professed in some Parts of Poland, particularly Podolia, Volhinia, as also in ancient Greece and Turkey in Europe.

## Of GREAT-BRITAIN.

THIS Country is called Britannia, principally because,

1. The Britons were the first Possessors of it. It was Custom among them to stain their Bodies with Sky-blue, in order to appear more formidable to their Enemies. Camden says, it received its Name from thence, the Term Britain signifying, in their Language, colouring. It came to be called Great-Britain from King James I. who in 1603 united England and Scotland, and gave these two Kingdoms only the Name of Great Britain. And 2. From Queen Anne

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Anne, who in her Reign brought these two Kingdoms to a stricter Union.

England and Scotland together in Length, according to Computation, is about 560 English Miles. It has long since been distinguished from other Countries by the Name of the British Islands, on Account not only of the many Islands that surround it, but also of the Kingdom of Ireland, which belonging to the Crown of Great-Britain, is parted from it by the Sea.

These Countries are divided into three Kingdoms, viz. England, or South-Britain, with Wales, which lies Southwards. 2. Scotland, or North-Britain, which lies Northwards. And 3. Ireland, a separate Island lying Westward.

### Of ENGLAND.

**E**NGLAND is bounded by Scotland on the North, from which it was divided by a Wall, at least four hundred Miles in Length, some small Remains whereof are still subsisting; on the West, with the Irish Sea, on the East with the German Ocean, and on the South with the Channel and Straits of Calais.

The Extent of England separately considered is about 320 Miles long, and nearly 40 broad, and is divided into two very unequal Parts; namely, 1. The Kingdom of England; and 2. The Principality of Wales, which in ancient Times was known by the Name of Cambria. England, in the Time of the Romans, was distinguished by the Name of Britannia, and its Natives were then known by the Name of Britons. But as those Britons were frequently invaded by their Neighbours the Scots, they called in the Anglo-Saxons to their Assistance, who indeed drove out the Scots, but made themselves, at the same Time, Masters of the whole Country, and from thence it received the Name of Anglia, or England. And they divided it into several distinct Kingdoms, or Provinces, namely, 1. Kent, 2. Suffex, 3. West-sax, 4. Essex, 5. Northumberland, 6. Mercia, and 7. East-Anglia. But now they cease to be separate Kingdoms; for though their Names are still retained, they were all united in Process of Time, and reduced under one Head.

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England is at present divided into several Counties or Shires. The first of which I shall mention is KENT, which notwithstanding it is distinguished by the Name of a County, is not, like most others, called a Shire. It contains 28 Parishes, two Cities, and 30 Market Towns. The Places of most Note in it are Canterbury, situate on the River Stour, which is a well-built City, and the See of an Archbishop, who is Primate of all England. 2. Rochester, situate on the River Medway, another City, tho' not so large as the former, and an Episcopal See under Canterbury. 3. Chatham, standing upon the same River, which is of Note for being the Station of the British Navy. 4. Gravesend, near the River Thames, a small Town and Harbour. 5. Greenwich, a Town of Note, for being the Birth-Place of Queen Elizabeth, and formerly the Royal Seat, with a noble Palace. At present there is a Royal and Magnificent Hospital for the Accommodation of disabled Seamen, and a delightful Park. 6. Tunbridge, an inland Town, much frequented by Persons of Distinction, on Account of the Medicinal Waters. 7. Dover, which, tho' but a small Town, is an excellent Harbour. It was formerly called the Key of England; it has a strong Castle, and is of Note for being the Station of the Packet Boat, and a Port greatly frequented by all Passengers to France. 8. About this Coast there is a general Road called the Downs, where the Ships that come to and from London, ride at Anchor till the Wind favours their further Progress.

MIDDLESEX is 19 English Miles long and 16 broad, and has seven Market Towns. The most noted Places in it are, 1. London, which is the Capital and Metropolis of the whole Kingdom; situate on the River Thames, and is one of the largest and most opulent Cities in the World. A full Description of it would require a distinct Volume. We shall only observe therefore, that it is an Episcopal See under the Archbishop of Canterbury. And that in the Western Part, called Westminster, is the Palace of St. James, the usual Residence of all the Kings of England. Not far from it is Westminster Abbey, in which the Kings of Great-Britain are crowned and buried; the two Parliament-Houses, the Treasury, the Admiralty, and Whitehall. Near Westminster-Hall there is a stately Bridge,

built over the Thames, the finest in Europe, and perhaps in all the World. At the Eastern Part of London is the Tower, where there are a great many Curiosities exposed to publick View; such as the Mint, the two Armouries, the Regalia, &c. 2. Kensington, a Royal Palace about three Miles distant from London, with most beautiful Gardens. 3. Hampton-Court, a stately Royal Palace about thirteen Miles distant from London, with most delightful Gardens.

ESSEX, from East to West, is 45 Miles long, and from North to South 35 Miles broad; it contains 415 Parishes and 22 Market Towns. The Places of most Note are, 1. Colchester, a flourishing Town on Account of the Woolen Manufactory there, and also peculiarly noted for its delicious Oysters. 2. Harwich, a Sea-Port Town and Harbour, of Note for the Packet-Boat that sails from thence for Holland.

SUSSEX is 60 Miles long and 20 broad, has 312 Parishes, and 19 Market Towns. The Places of most Note are, 1. Chichester, an Episcopal See, and a flourishing City. It is encompassed with good Walls, and has six Parish Churches. 2. Arundel, which, tho' but a small Town, is of Note on Account of its Earls and its strong Castle. 3. Rye, which is one of the Cinque-Ports, and opposite to Dieppe. Most of the Inhabitants are Fishermen by Profession.

SURRY is 34 Miles long and 20 broad, it contains 11 Parishes, and 9 Market Towns. The Places of most Note are, 1. Richmond, where there is a Royal Seat and Gardens, pleasantly situated on a Hill near the River Thames. 2. Lambeth House, the usual Residence of the Archbishop of Canterbury. 3. Kingston upon Thames, which is a great Market Town, and in which the Country Assizes are generally held: It was formerly a noted Place on Account of the Saxon Kings being crowned there; and from whence it derives the Name of King's Town.

HAMPSHIRE, from North to South, is 50 Miles long, and from East to West 30 Miles broad. It has 53 Parishes and 23 Market Towns. The Places of most Note are, 1. Winchester, which is an Episcopal See, and has a Cathedral. It is a City of great Antiquity, and very pleasantly situated. 2. Southampton, which is the Count

Town, and has a fine Harbour for Shipping. 3. Portsmouth, which is a famous Sea-port upon the Channel, and a valuable Storehouse for the Royal Navy. 4. Spithead, not far from Portsmouth, which is of Note on Account of the English Fleet assembling there. 5. The Isle of Wight, which is 20 Miles long and 12 broad. It is a very healthy, pleasant, and plenteous Place; it has four Market Towns in it, four Castles, and 36 Parishes.

BERKSHIRE, from East to West, is 46 Miles long, and from North to South 30 Miles broad. It has 140 Parishes and 12 Market Towns. The Places of most Note are, 1. Reading, which is the County Town. 2. Windsor, which is a Royal Palace, and a good Market Town.

WILTSHIRE, from North to South, is 39 Miles long, and from East to West is 29 Miles broad. It has 304 Parishes in it, and 21 Market Towns. The Places of most Note are, 1. Salisbury, which is an Episcopal See under the Archbishop of Canterbury. Near this City is the prodigious Plain, whereon stands Stone-Henge, which is one of the Wonders of England. 2. Malmesbury, which is a Market Town, and a Place of good Trade for such as deal in the Woollen Manufacture.

DORSETSHIRE, from East to West, is 45 Miles long, and from North to South 25 Miles broad. It contains 248 Parishes, and 18 Market Towns. The Places of most Note are, 1. Dorchester, the principal Town, which has three high-Streets, and as many Parishes. The Maiden Castle stands about 300 Paces from the Town. 2. Weymouth, a Market Town and Harbour. 3. Portland, which lies three Miles distant from Weymouth. It is a Peninsula, about seven Miles in Circumference, and almost surrounded with Rocks. Portland Castle is the only Landing Place. This Town affords the best Stone Quarries for Building, any throughout all England.

SOMERSETSHIRE, from East to West is 55 Miles long, and from North to South 42 Miles broad. It contains 385 Parishes, and 36 Market Towns. The Places of most Note are, 1. Bristol, which is a large and opulent City; the River Avon runs through the Middle of it, over which is a Stone Bridge. It is an Episcopal See under the Archbishop of Canterbury. 2. Bath, which is famous for its medicinal Waters and hot Baths; the City indeed is but

small, and has, besides the Cathedral, but one Parish Church. 3. Wells, which lies about 15 Miles distant from Bath. These two Places make but one Episcopal See, under the Archbishop of Canterbury.

DEVONSHIRE, is 54 Miles long and 45 broad, and contains 394 Parishes, and 39 Market Towns. The Places of most Note are, 1. Exeter, which is a large well-built City, and an Episcopal See, consisting of 15 Parishes, and is a Place of great Trade, particularly for the Woollen Manufacture. 2. Plymouth, which from a Village of Fishermen only, is become one of the most flourishing Towns in all England. It has a fine Haven, strongly fenced by a Fort, on St. Nicholas's Isle. It is one of the principal Magazines of the British Kingdom, a Place of great Importance, not only to the Crown, but to the Merchants of England. Opposite to the Haven the Sea forms a small Bay, which is called Torbay.

CORNWALL, from East to West, is 70 Miles long, and 49 Miles over, where it is broadest; it is the farthest County in the West of England. It contains 160 Parishes and 24 Market Towns. The Places in it of most Note are, 1. Falmouth, which has a fine Harbour and a Fortification. 2. Land's End, which is the most Western Part of England. 3. Opposite thereto are the Islands of Scilly, amongst which that of St. Mary is the principal.

CAMBRIDGESHIRE, from North to South, is 35 Miles long, and from East to West about 20 Miles broad. It has 163 Parishes, and 18 Market Towns. The Places of most Note are, 1. Cambridge, which is a famous University consisting of 12 Colleges and 4 Halls. The Town contains 14 Parishes. 2. Ely, which is formed into an Island by the River Ouze. The City of Ely is an Episcopal See under the Archbishop of Canterbury.

NORFOLK, from East to West, is about 50 Miles long and from North to South near 35 Miles broad. It contains 660 Parishes, and 31 Market Towns. The Places of most Note are, 1. Norwich, which is a large and well-built City, and an Episcopal See under the Archbishop of Canterbury; and a Place of great Trade, especially in the Weaving Way. 2. Yarmouth, which, tho' but a small Town, is a fine Harbour.

SUFFOLK, from East to West, is about 45 Miles long, and from North to South near 30 Miles over. It contains 75 Parishes, and 32 Market Towns. The Places of most Note are, 1. Ipswich, which is the principal Town, and Place of great Antiquity. It contains 12 Parish Churches, a very populous Town, and carries on a large Trade in the Woollen and Linen Manufacture.

BUCKINGHAMSHIRE, from South to North, is 40 Miles long, and from East to West it is scarce 18 Miles broad. Its principal Town is Buckingham.

HERTFORDSHIRE, from North to South, is about 40 Miles long, and from East to West about 30 broad. It has 185 Parishes, and 15 Market Towns; the principal whereof is Hertford.

BEDFORDSHIRE, from North to South, is about 24 Miles long, and from East to West 13 Miles broad. There are 16 Parishes, and 10 Market Towns; the principal whereof is that of Bedford.

HUNTINGDONSHIRE is about 20 Miles long, and 18 broad. It contains 79 Parishes, and 6 Market Towns; the principal whereof is Huntingdon.

NORTHAMPTONSHIRE is about 45 Miles long, and 20 broad. It has 326 Parishes and 12 Market Towns. The Places of most Note are, 1. Northampton, the County Town. 2. Peterborough, which is a fine City and an Episcopal See under the Archbishop of Canterbury.

OXFORDSHIRE, from North to South, is about 40 Miles long, and from East to West near 26 Miles broad. The Places of most Note are, 1. Oxford, in which is erected the most famous University in Europe. It is likewise an Episcopal See under the Archbishop of Canterbury. As to the City itself it has nothing extraordinary to recommend; the Colleges, however, are very grand and magnificent, and excel all the Academies in Europe: The Number of them amounts to 20, and there are five Halls likewise set apart for the same Purposes. 2. Woodstock, near which is the famous Blenheim House, which was erected here in Commemoration of the signal Victory obtained by that brave General the Duke of Marlborough, over the French, near Blenheim in Germany.

GLOUCESTERSHIRE, from North to South, is 24 Miles long, and from East to West 28 Miles over. It contains



280 Parishes, and 30 Market Towns. The Place of Note in it is Gloucester, which is a fine City, and an Episcopal See under the Archbishop of Canterbury.

**MONMOUTHSHIRE**, from North to South, is 35 Miles long, and from East to West about 18 Miles broad. It contains 127 Parishes and 8 Market Towns; among which, that of Monmouth is the principal: Of the ancient Glory whereof we may form some adequate Idea from the Ruins which are still remaining.

**HEREFORDSHIRE**, from North to South, is 35 Miles long, and from East to West 30 Miles over. It has 17 Parishes in it, and 8 Market Towns. The Place of Note therein is Hereford, a fine City, and an Episcopal See under Canterbury.

**WORCESTERSHIRE**, from North to South is 32 Miles long, and from East to West 22 Miles over. It has 14 Parishes, and 11 Market Towns. The Place of Note is the City of Worcester, which is an Episcopal See under the Archbishop of Canterbury.

**WARWICKSHIRE**, from North to South, is 33 Miles long, and from East to West 25 Miles broad. It has 15 Parishes, and 18 Market Towns. The Places of Note are, 1. Warwick, famous for its Castle, which is a stately Structure; as also in high Repute on Account of that puissant Hero, Guy, Earl of Warwick. 2. Coventry, a fine City situate on the River Sherbourn; it is well built and a Place of great Trade. Formerly it was an independent Episcopal See, and not joined to that of Litchfield.

**LEICESTERSHIRE**, from North to South, is 33 Miles long, and from East to West 27 Miles broad. It contains 200 Parishes, and 13 Market Towns. The principal Place of Note is Leicester, which consists of 3 Parishes.

**RUTLANDSHIRE**, is the smallest of all the Shires in England; its whole Circumference is not above 40 Miles. It has only 49 Parishes and two Market Towns; namely Okeham, which is the County Town, and Uppingham.

**LINCOLNSHIRE**, from North to South, is 60 Miles long and from East to West 55 Miles over. It is divided into three distinct Branches, namely Lindsey, Kestern, and Holland; which contain in the whole 930 Parishes, and 34 Market Towns; Lincoln is the most noted Place, an Episcopal See, and a very ancient City.

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NOTTINGHAMSHIRE, from North to South, is 38 Miles long, and from East to West 20 Miles broad. It is divided from Lincolnshire by the River Trent, and contains 68 Parishes and 10 Market Towns. The Place of most Note is Nottingham, which is looked upon as one of the completest Towns in all England, and peculiarly for its Castle: As a very considerable Part of it is cut out of one Rock, it has not a Rival, nor is any Fortification in the British Dominions equal to it.

DERBYSHIRE, from North to South, is 38 Miles long, and from East to West 28 Miles over. It contains 106 Parishes and 10 Market Towns. The Place of most Note is Derby, situate on the River Derwent, over which is erected a fine Bridge, all of Freestone, with a Chapel upon it.

STAFFORDSHIRE, from North to South is about 44 Miles long, and from East to West 26 Miles over. It has 30 Parishes, and 19 Market Towns: Of which, 1. Stafford is the County Town; and 2. Litchfield is a City and with Coventry an Episcopal See: The Cathedral is a curious Structure, and a great Addition to the Honour of the Place,

SHROPSHIRE, from North to South, is 34 Miles long, and from East to West 25 Miles over. It borders upon Wales, contains 170 Parishes, and has 16 Market Towns. The Place of most Note is Shrewsbury, which is almost encompassed by the River Severn, and, for the Beauty and Regularity of its Building, is very little inferior to any of the Cities in England. It is surrounded likewise by a strong Wall, and has an ancient Castle for its Bulwark and Defence.

CHESHIRE, from East to West, is about 45 Miles long, and from North to South 25 over. It contains 86 Parishes, and 14 Market Towns. The Place of most Note is Chester, which is an Episcopal See under the Archbishop of York. It has a strong Wall fortified with seven Watch Towers.

YORKSHIRE is 80 Miles long and 70 broad; being the largest County in all England. It contains 563 Parishes besides Chapels of Ease, and 46 Market Towns. The Places of most Note are, 1. York, which is generally look'd upon as the second City in all England. It is an Archbishop's See. The Streets are large and beautiful, and the Cathedral there is a stately Structure, 2. Hull, or Kingston upon Hull, which is a large Town, notwithstanding there

there are but two Parishes in it. There is a Key and a Court-House. The Buildings are very regular and beautiful and there are no Fortifications in England that are stronger. 3. Richmond on the River Swale is a Town, well built, and much frequented by Persons of Distinction. From this Town and Shire the Duke of Richmond receives his Title.

**LANCASHIRE**, from North to South, is 45 Miles long and from East to West 31 Miles broad. It is a large Maritime County, and joins Eastward to Yorkshire. It has 6 Parishes and 25 Market Towns. The Place of most Note is Lancaster, in which there is a fine Castle, notwithstanding it is but a small one.

**CUMBERLAND**, from North to South, is 50 Miles long and from East to West about 38 broad. This is the farthest County in England, and borders on Scotland. It contains 58 Parishes and 16 Market Towns. The Place of most Note is Carlisle, which is situate on the River Eden. It is an Episcopal See under the Archbishop of York, and is surrounded by a strong Wall.

**WESTMORELAND**, from North to South, is 35 Miles long, and from East to West 24 Miles broad. It joins Eastwards to Cumberland, contains 36 Parishes, and 16 Market Towns, whereof Appleby is the principal.

**DURHAM** is about 23 Miles long, and 30 broad. It is a Northern Maritime County, and is called likewise the Bishoprick of Durham. It contains 118 Parishes, and 16 Market Towns. The City of Durham is a very ancient one; it is an Episcopal See under the Archbishop of York. The Cathedral there is very beautiful.

**NORTHUMBERLAND**, from North to South, is 40 Miles long, and from East to West about 30 Miles broad. It is a Maritime County, bordering North on Scotland. It has 460 Parishes and 6 Market Towns. The Places of most Note are, 1. Berwick, a Sea-port on the Confines of Scotland, and situate on the Tweed. It is a strong Place and the principal Key to Scotland; and 2. Newcastle on Tyne, which stands on a Hill of an easy Access. This Town is surrounded with a Wall, and has a Castle, but in a very ruinous Condition. Every Thing is plentiful there, as the Place is encompassed with Coal Fields and a navigable River.

*Of the Principality of W A L E S.*

**T**HIS Principality was once a Kingdom, and known by the Name of *Cambria*; and the Inhabitants are the Offspring of the ancient Britons, who retain their Language to this Day. It is 120 Miles long, and 80 Miles broad; the eldest Son and Heir apparent to the Crown of Great-Britain, is stiled the Prince of Wales. This Principality is divided into **NORTH** and **SOUTH** Wales.

**NORTH WALES** is subdivided into six Counties or Shires, namely, 1. *Montgomeryshire*, 2. *Merionethshire*, 3. *Caernarvonshire*, 4. *Denbighshire*, 5. *Flintshire*, and 6. Two Islands in the Irish Sea.

**MONTGOMERYSHIRE** is 30 Miles long, and about 22 Miles broad; it has 47 Parishes in it, and 6 Market Towns. Tho' it be a very mountainous Country, yet the Valleys along the River Severn are very delightful. The Places of most Note are, 1. *Montgomery*, which has the Privilege of sending a Member to Parliament, and 2. *Machent*, which is the County Town.

**MERIONETHSHIRE**, from North to South, is 36 Miles long, and from East to West 20 Miles broad. It is a Maritime County, has 37 Parishes in it, and three Market Towns. The Hills in this Part of Wales are so very high, that it requires a Day's Journey to reach the Summits of them.

**CAERNARVONSHIRE** is about 40 Miles long and near 20 Miles broad. It is a Maritime County, has 68 Parishes, and 5 Market Towns, whereof 1. *Caernarvon* is the principal; 2. *Bangor*, which is an Episcopal See under the Archbishop of Canterbury.

**DENBIGHSHIRE** is about 30 Miles long, and near 18 Miles broad. It is a Maritime County, has 57 Parishes, and 4 Market Towns; the principal whereof is *Denbigh*.

**FLINTSHIRE** is about 24 Miles long, and near 8 Miles broad. It has 21 Parishes and 2 Market Towns; whereof 1. *Flint* is the County Town, and 2. *St. Asaph*, which is a Bishop's See under the Archbishop of Canterbury.

There are two Islands in the Irish Sea, the one is called **ANGLESEY** and the other the **ISLE OF MAN**.

The Island of **ANGLESEY** is about 20 Miles long, and 10 Miles broad. It has 74 Parishes in it, and 2 Market Towns.

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It is divided from Caernarvonshire by a narrow Strait about 2 Miles over.

THE ISLE OF MAN is about 30 Miles long, and near 10 Miles broad. It contains 17 Parishes and 5 Market Towns. It was taken from the Scots by an old Earl of Salisbury, who afterwards enjoyed it with the Title of King in Man.

SOUTH WALES is subdivided into six Counties, namely 1. Glamorganshire, 2. Brecknockshire, 3. Caermarthenshire, 4. Pembrokehire, 5. Cardiganshire, and, 6. Radnorshire.

GLAMORGANSHIRE is 40 Miles long, and 30 broad. It has 18 Parishes and 11 Market Towns. The Place of most Note is Landaff, which is an Episcopal See under the Archbishop of Canterbury.

BRECKNOCKSHIRE is about thirty Miles in Length and near 20 in Breadth. It has 61 Parishes and 4 Market Towns; amongst which, Brecknock is the principal. The Place is walled round, and has a Castle belonging to it.

CAERMARTHENSHIRE is about 35 Miles long, and 20 broad. It has 87 Parishes and 8 Market Towns. The Place of most Note is Caermarthen; which was the Birth place of that celebrated British Enchanter Merlin.

PEMBROKESHIRE is about 26 Miles long, and near 20 broad, it has 145 Parishes, 8 Market Towns, and 10 Castles. The Places of most Note are 1. Pembroke. 2. Milford-Haven; which is looked upon as the best in England; having 13 Roads, 16 Creeks, and 5 Bays. 3. St. David's, which is a City and an Episcopal See, under the Archbishop of Canterbury.

CARDIGANSHIRE is about 32 Miles long; and 15 broad. It has 64 Parishes and 4 Market Towns: The principal whereof is Cardigan.

RADNORSHIRE is 24 Miles long and 22 broad.

ENGLAND, in general, is a Country which enjoys a temperate Air, the Soil produces Plenty of Grain and Fruit; but little Wine and Oil, with which it is supplied from other Countries: As for Beer there is none so good as in all the Northern Countries. It abounds with Catfifh, Game, Fish, &c. and in short is blessed with all the necessaryes of Life.



The English are curious, inquisitive, of a quick and penetrating Wit, deep Knowledge, and a solid Judgment; they are brave, being both good Soldiers and Seamen; of ready Genius for mechanical Arts, and Improvers of whatever they undertake.

The establish'd Religion in England is the Protestant, but it is divided into two Parties: The one is the Church of England as by Law established, and the Members thereof are distinguished by the Name of Churchmen: The other Party, who assemble in Meeting-Houses, for the Performance of Divine Worship, are distinguished by the Name of Dissenters.

The principal Rivers in England are, 1. the Thames, 2. the Severn, 3. the Ouse, 4. the Medway, 5. the Trent, and 6. the Humber, which last is rather an Arm of the sea, into which several Rivers empty themselves; and others of lesser Note, too many to be here enumerated.

The Orders of Knighthood are two; 1. the Knights of the Bath, first created by King Henry IV. 1399. 2. The Knight of the Garter, which is the chief Order of England, begun 1350, being founded by King Edward III.

## Of SCOTLAND.

Scotland is divided from England by the River Tweed Southwards. It has the German Ocean on the East; the Irish Sea, and the Western Isles on the West; and the Deucalionian Sea, with the Orcades on the North. For the Dimensions of the Kingdom in general comprehending the Islands (of which there are in the Western about 300) it is not much less than England, and according to modern Geographers about 315 Miles long, but above 190 broad.

The whole Kingdom is divided by the River Tay, into South and North Parts; the South Part whereof is most populous and civilized, and better cultivated than the North Part; the latter still retaining the Customs and Manners of the ancient Irish.

The Territories or Counties in the South of Scotland, distinguished into 1. Tiviotdale, 2. March, 3. Lauderdale, 4. Liddesdale, 5. Eshdale, 6. Anandale, 7. Niddesdale

desdale, 8. Galloway, 9. Carrick, 10. Kyle, 11. Cunningham, 12. Arran, 13. Clydesdale, 14. Lenox, 15. Stirling, 16. Fife, 17. Strathern, 18. Monteith, 19. Angus, 20. Cantire, and 21. Lorne.

The most remarkable Things in the South of Scotland are, 1. Edinburgh, the capital City in the whole Kingdom where there is an University, and a strong Castle; 2. St. Andrew's, near the North Sea, which has a good Harbour, University, and Archbishoprick; 3. Glasgow, famous for its University, and its pleasant Situation.

In the North of Scotland there are 13 Counties; the Capital City is Aberdeen. The different Names of the Counties in the North Part of Scotland are, 1. Lochaber, 2. Broadalbin, 3. Perth, 4. Athol, 5. Angus, 6. Mearns, 7. Mar, 8. Buchan, 9. Murray, 10. Ross, 11. Sutherland, 12. Caithness, and 13. Strathnavern.

These are again divided into Sherifffdoms, Stewardships, and Balliwicks, which were inherited, for the most Part by noble and ancient Families. But this Constitution lately alter'd by Act of Parliament.

The principal Rivers in Scotland are the Tweed, Clyde, Tay and Spay, all navigable; besides many Lakes, which Lomond and Ness are the most remarkable; there are innumerable Creeks and Bays, which afford many Harbours convenient for Trade and Fishing.

The most noted Harbours about Scotland are, 1. Leith, 2. St. Andrews, 3. Dundee, and 4. Montross. Scotland in general abounds with Corn, Cattle, Fowl, Fish, Woods, Coals, Salt, Rivers, Fountains, and all Things not necessary for the Use of the Inhabitants, but sufficient to drive a considerable Trade with other Nations; there being yearly exported vast Quantities of Fish, Corn, Cow Hides, Tallow and Linen Cloth. There are Lead and Iron Mines in Abundance, and, as some affirm, there are Gold and Silver Mines amongst them. The Air is thin but more pure than that in England.

The Scots have sufficiently shewn their Valour in the World, particularly by their Behaviour in struggling for their Liberties. The Nobility and Gentry of Scotland are great Lovers of Learning; they frequent not only their own Universities, but also those of England, France,

other Countries. The Men in general are well-made, and of a robust hale Constitution.

The Religion which prevails in Scotland is the Protestant. They are divided however as they are in England, with this Difference, that those who dissent from the Church of England, and are called Presbyterians, are in much greater Number than the Churchmen; so that Presbyterianism is the established Religion of the Country. There are, however, two Archbishops, the Archbishop of St. Andrew's, Primate and Metropolitan of all Scotland; and the Archbishop of Glasgow, who is also Metropolitan; under the former are eight, and under the latter are four Bishops.

The Government in Scotland, before the Union, which was established in Queen Anne's Reign, was supported, like that of England, by King and Parliament, which was called together at Edinburgh; at present they are limited to 16 Peers and 45 Commoners, to sit in the British Parliament at Westminster, according to the Union Act, which subjects both Kingdoms to the same Government.

The Scotch Islands are the Isles of Orkney, which lie Northwards, and are 28 in Number; Pomona, the best, is a Bishop's See. 2. The Isles of Shetland, 68 in Number, not very fruitful. 3. The Western Isles are 16 in Number, but of no great Importance.

The Scotch Order of Knighthood is that of St. Andrew, instituted by Achaius King of Scotland. The Collar, at which hangs the Image of that Saint, imitates Thistles and Rue, denoting that the one is not touched without hurt, and the other is an Antidote against Poison.

*Of the Kingdom of IRELAND.*

IRELAND was probably so called from the Word Hiere, which in the Irish Language signifies West, or Western Coast, because this Country lies farther Westwards than any Country in Europe. It is a pretty large Island; Length near 270 English Miles, and in many Parts it is Breadth about 155. Eastward, it is opposite to England; Westward, to the Irish Seas; Southward to the Atlantic Ocean; and Northward,

ward, to the Scottish Sea. It is divided into four Capital Provinces, viz. 1. Munster, 2. Leinster, 3. Connaught and 4. Ulster.

MUNSTER, is divided into six Counties, viz. 1. Kerry, 2. Cork, 3. Waterford, 4. Tipperary, 5. Limerick, and 6. Clare.

LEINSTER, is divided into twelve Counties, viz. 1. East-Meath, 2. West-Meath, 3. Louth, 4. Longford, 5. King's County, 6. Queen's County, 7. Catherlough, 8. Kilkenny, 9. Kildare, 10. Waxford, 11. Wicklow and 12. Dublin.

CONNAUGHT is divided into five Counties, viz. 1. Sligo, 2. Leitrim, 3. Roscommon, 4. Galway, and 5. Mayo.

ULSTER is divided into nine Counties, viz. 1. Antrim, 2. Down, 3. Armagh, 4. Londonderry, 5. Savan, 6. Donnegal, 7. Fermenagh, 8. Tyrone, and 9. Monaghan.

There are seven Cities in this Kingdom; whereof in Munster are four, viz. 1. Cashel in the County of Tipperary, an Archbishoprick and walled Town, noted for the great Rock, called St. Patrick's Rock, whereon stands the Cathedral, to which there is Access only by one narrow Foot-Way, hewn on the Side of the Rock, which is walled in, and is a strong Place of Defence. 2. Cork, a large City and noted Harbour on the South Coast, is a Bishop's See likewise. 3. Limerick, another Seaport on the West Coast, strongly fortified by Art and Nature; the Part called the English Town, being encompassed by the River Shannon; this is likewise a Bishop's See. 4. Waterford, a fine Harbour and Bishop's See. In Leinster are two Cities, viz. 1. Dublin, the Metropolis of the Kingdom, a large Seaport and of great Trade, has an University, and is an Archbishopric. 2. Kilkenny, an inland Town, finely situated on the River Nudor, is a Bishop's See under the Title of Leighlin and Ferns. In Ulster are two Cities, viz. Londonderry, a strong Town, famous for holding out a long Siege against the late King James's Army in the Irish Wars. Besides these Cities, there are great many Towns of Note both on the Coasts and Inland.

In Ulster is likewise the Town of Armagh, the Metropolitan Archbishopric, and Primacy of all Ireland;

Connaught is Tuam, another Archbishoprick, and under these four are eighteen Bishops, who preside over the inferior Clergy.

The most noted Rivers in Ireland are the Shannon, which is the principal River in the whole Country, and empties itself into the Western Ocean, 2. The Barrow.

The Sewer. 4. The Boyne, which flows by Drogheda, and empties itself into the Irish Sea. And 5. The Nuor, which last, with the Sewer and Barrow, all join together near Waterford, and fall into the Sea, besides many other small Rivers. The Country abounds with Lakes or Loughs.

The Commodities of Ireland consist chiefly in Cattle; the Air is mild, but moist and foggy; the Soil is not very proper for Corn, it being always poor, and it never ripens to Perfection. The Pasture is rich in some, and but indifferent in other Places, but altogether it is a fine Country, and capable of Improvements; and the People are free from being annoyed by any venomous Creatures, since they never harbour or breed there.

A certain Author gives the following Description of the Irish, "They are (says he) a strong and bold People, martial and prodigal in War, nimble, stout, and courageous, careless of Life, but greedy of Glory; courteous to Strangers, constant in Love, light of Belief, impatient of Injury, given to Lasciviousness, and in Enmity implacable." But as most Writers are partial in their Characters of Countries, according as they stand affected towards them, there is no relying on the bare Report of a single Author in such Cases.

The greatest Part of the Natives are Roman Catholics, as the Laws have been put in Execution for establishing the Church of England in that Kingdom, it has already and will in Time lessen the Number of the Papists, and increase that of the Protestants.

Ireland belongs to the Crown of Great-Britain, and is govern'd by a Lord Lieutenant, who acts in the Name, by the Authority of the King.

The other Countries which belong to the Crown of Great Britain, in Europe, are the Isles of Man, Jersey, Guernsey, Gibraltar, Minorca, and formerly Majorca.

Though with regard to the Isle of Man, it has, Time out of Mind, been an hereditary Royalty, or Principality, in the

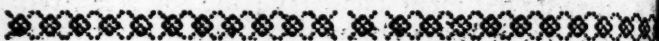


the Stanley Family, Earls of Derby, and is now descended by Marriage, to his Grace the Duke of Athol, a Peer of North-Britain.

In Asia, several small Islands, besides the Settlements and Factories in India, viz: Bengal, Fort St. George, &c.

In Africa, some Part of Guinea, also the Island St. Helena, now enjoyed by the East-India Company.

In America; Carolina, Georgia, Jamaica, Virginia, New-England, New-York, New-Jersey, Pensilvania, Maryland, several of the Caribbee Islands, as Antigua, Barbadoes, Nevis, Bermudas, St. Christophers, &c.



*An ACCOUNT of the Births, Characters, and Personal Qualities, of the Monarchs of England, from WILLIAM the Conqueror to the Reign of his present Majesty King GEORGE the Third.*

#### N O R M A N K I N G S.

**W**ILLIAM the Conqueror was Son of Robert Duke of Normandy, by one of his Mistresses named Harlotte, (whence some imagine the Word Harlot derived) Skinner's Daughter of Falaise; which gave occasion to his being surnamed the Bastard; but this he afterwards changed to that of Conqueror, from his subduing England. He was born in 1026; and succeeded his Father Duke of Normandy 1035; being at that Time but nine Years old; and after his Victory at Hastings in Suffex was crowned King of England on the 14th of October Anno 1066.

He was tall, and so big, that his Corpulency grew troublesome to him in his latter Years. His Strength was great, that Historians say, no Person but himself, could bend his Bow. He was laborious, seasoned to all the Hardships of War, and patient in all Seasons, Hunger, and Thirst. He had a great Soul, and elevated Mind; and so prodigious a Genius, that nothing escaped his Examination. He delighted in War; understood it well, and was successful in it. When once raised to Anger, it was almost impossible to appease him.

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He died of a Fever at Roan in Normandy, the 9th of September, 1087, in the 61st Year of his Age, and was buried at Caen in St. Stephen's Abbey, which he endowed with rich Revenues.

**WILLIAM II.** surnamed **RUFUS.**

**WILLIAM** the Second succeeded his Father; was legitimate Son of Maud, Daughter to Baldwin the fifth Earl of Flanders.

He was born in the Year 1056; was crowned King of England by Lanfranc, Archbishop of Canterbury, on the 7th of September, 1087; and being wounded accidentally, as he was hunting in New Forest, by one of his Domesticks, named Walter Tyrrel, a French Knight, died of the Wound on the 2d of August, 1100, and in the 13th Year of his Reign, aged 44 Years.

The only good Quality remarkable in him, was his signal Courage which rose almost to Fierceness: And he carried his Vices and Tyranny to so great a Height, that the Wound he received was considered, not as the Effect of mere Chance; but as sent by the Hand of God, in order to rid the English of so wicked a Prince.

**HENRY I.** surnamed **BEAU-CLERC.**

As King **RUFUS** left no Issue, his Brother Henry (by the same Mother) succeeded him, and was crowned King by Maurice Bishop of London, on the 5th of August, 1100.

He was married first to Maud, Daughter to Malcolm, King of Scots; and afterwards to Adeliza, Daughter to Geoffrey Earl of Louvain, by whom he had no Issue.

His Death was occasioned by eating too many Lambs, which threw him into a Fever, of which he died in the Castle of Lyon in Brai near Roan, on the 1st of December, 1135, after a Reign of 35 Years; and was buried in the Abbey of Reading in Berkshire. He was very handsome, brave, and had a great Capacity; was extremely sober, inexorable to Offenders: He had a great Love for Learning, whence he was called Beau-Clerc; but these good Qualities were sullied by Cruelty, Avarice, and uncleanness.

**HOUSE**

## HOUSE of BLOIS.

## STEPHEN, King of England.

After Henry's Decease, Stephen, Son to Adela, Daughter of William the Conqueror, and of Stephen, Earl of Blois, was crowned at Westminster the 26th of December, 1135.

He died the 25th of October, 1154, in the nineteenth Year of his Reign, and fiftieth of his Age; and was buried in Feversham Abbey.

His Merit consisted in the Greatness of his Courage, elevated Genius, and Soundness of his Judgment. Greatly skilled in military Affairs; had great Experience, and a wonderful Patience. His Clemency and Munificence were the least of his Virtues: All these were heightened by the Stature and Majesty of his Person; which rendered him one of the most amiable Princes of his Time.

## HENRY II.

HENRY II. surnamed Plantagenet, and Duke of Normandy, succeeded Stephen. He was eldest Son of Geoffrey Earl of Anjou, Touraine, and Maine, and of the Empress Maud, sole Heir to Henry I. Duke of Normandy.

He was born at Mans the 4th of March, 1133, and was adopted by King Stephen the 6th of November, 1153, and crowned King of England the 19th of December, 1155.

He possessed many good Qualities: He was just, brave, generous, magnificent, clement, and prudent: But his Ambition and Lust were insatiable, and his Anger very violent.

On his Death-Bed he caused himself to be carried to the Church of Chinon; and being laid before the Altar, expired. His Corpse was carried to Fontevraud, as he had ordered, and was there interred. He died the 6th of July, 1189, in the 56th Year of his Age; having reigned 34 Years, eight Months, and 11 Days.

## RICHARD I. surnamed Lion's Heart.

After the Death of Henry II. his second Son Richard succeeded him. His Mother was Eleanor of Aquitaine, Duchess

Marchefs of Guinne and Gascony, &c. His exceeding  
valour acquired him the Name of Cœur de Lion, or Li-  
on's Heart; but for any other Virtue, it is needless to  
seek for it. His Person was well-shaped; blue Eyes, but  
full of Fire; and his Hair of a sandy Colour. His Death  
was occasioned by a Wound he had received by an Arrow  
in the Siege of Chaluz in Limoufin; of which he died  
April 6, 1199, in the 43d Year of his Age, and 10th  
of his Reign, and was buried at Fontevraud.

### J O H N, surnamed Sans Terre.

This Prince came to the Crown by Virtue of the last  
Will of Richard. After having gone through many Trou-  
bles, Vexations, and Disappointments, during his Reign,  
chiefly owing to his Vice and Ambition, he died at New-  
market, October 8, 1216, through Grief, for having lost his  
treasure, which was very rich, which threw him into a  
fever, and was augmented by eating too many Peaches.  
He had Wit; but it was of the vicious Kind: Was hot-  
headed, restless, and hasty; had no Resolution; but in his  
first Transports; which being over, he was soft, indolent,  
wavering, and wavering. Was cruel, voluptuous, and cove-  
tous; had no Religion, Conscience, Honour, or Regard  
to Futurity. He died in the 51st Year of his Age, and in  
the 18th of his Reign.

### H E N R Y III.

This Prince succeeded his Father, in the 10th Year of  
his Age: He was born October 1, 1207; and crown'd at  
Bristol, October 28, 1216; and died in London the  
6th of November, 1272, aged sixty-six; of which he had  
reign'd fifty-six Years and twenty Days.

He was a Prince of very few Parts; naturally inconstant  
and capricious. He loved Money to excess; but then he  
squander'd it away so idly, that the prodigious Sums he  
levied on his Subjects, did not make him the richer.  
Nothing can be said as to his Courage, because he never  
show'd any sensible Tokens of it; but he may be justly ap-  
plauded for his Continnence, and Aversion to whatever  
led to Cruelty; and to conclude his Character; his  
Weakness in suffering himself to be govern'd by haughty,  
self-

self-interested Counsellors; and the arbitrary Maxims still'd into him from his Infancy, were the real Causes of the Commotions which disturb'd his Government.

### EDWARD I. surnamed Long-Shanks.

After the Death of Henry III. Edward, his eldest Son by Eleanor of Provence, succeeded him, and was crown'd on the 19th of August, 1274; and Historians say, that on his Coronation-Day, five hundred Horses were let loose about the Fields, with Liberty to every Person to keep as many as they could catch.

He was extremely well-shaped, and very tall, but his Legs were a little too long; on which Account he was surnamed Long-Shanks. He was an excellent King, a good Father, a formidable Enemy, and a brave Captain: He was chaste, just, prudent, and moderate; and on his Death-Bed exhorted his Son to continue the War with Scotland; adding, "Let my Bones be carried before you to Battle, for I am sure I am that the Rebels will never dare to stand the Sight of them."

He died at Borough on the Sands, a small Town in Cumberland, the 7th of July, 1307, after a Reign of thirty-four Years, seven Months, and twenty Days. His Body was taken to Westminster, where it was enclosed in Wax and deposited near that of the King his Father.

### EDWARD II.

Prince Edward, after his Father's Death, succeeded him and was the only Son that survived him. He began his Reign 1307, and was one of the most handsome and best shaped Men of his Time; and had so majestic an Air, that it was almost impossible to look on him, without entertaining an Esteem for him: But the Beauties of his Body did not correspond with his Mind. He was neither a Warrior, nor a Politician; neither zealous for his Country's Good, nor passionate of Glory; neither was he endued with a Capacity for difficult Affairs, nor had he a Genius sufficient to contrive, or Resolution to go through with such: To these Circumstances were owing all the Mistakes of his Reign. This Monarch was deposed, and his Son proclaimed King in his stead; and was imprison'd at Kenelworth.



Wenlock Castle; but removed afterwards to Berkeley Castle; where Sir Thomas Gurney and Sir John Maltravers put him to a cruel Death; causing a red-hot Iron to be thrust up his Fundament, and in these cruel Torments expired in October 1327, after a Reign of twenty years.

**EDWARD III.**

Edward the Third, eldest Son to the deceased King, by Isabella of France, succeeded his Father at the Age of 14, and in 1327.

Historians say, that the bare Aspect of this Prince drew Respect and Veneration. He was gentle and beneficent to the People of Virtue; but to the Vicious inexorable: A Friend to the Poor, the Widow, and Orphan, and to all the Unfortunate in general; and his greatest Delight was to sooth their Mistortunes; and though his Valour was well known to the World, it never puffed him up. His Subjects were dear to him; and the uninterrupted Union that subsisted between him and his Queen, augmented his Felicity. In short, he might have been looked upon as a perfect Prince, had not his Ambition prompted him to break, in an illaudable Manner, the Peace he had concluded with the Scots.

He died the 21st of June, 1377, in the 65th Year of his Age, and 51st of his Reign.

**RICHARD II.**

This Prince (who was Grandson to the deceased King) came to the Crown in the 11th Year of his Age, was born at Bourdeaux the 6th of January, 1336, and made Prince of Wales in 1377. Twenty-four Days after Edward died, Richard was crowned at Westminster.

He was Son to Edward the Black Prince, (so called on account of his wearing black Armour) who was the first created Prince of Wales.

This unfortunate Prince being of a lavish and profuse Disposition, caused his Subjects to revolt from him, and take Arms against him: And at his Return from Ireland was seiz'd and imprison'd in Flint Castle, near Chester; but some Time after, was sent to Pontefract Castle in York.

Yorkshire, where Sir Pyers Exton, with eight Men, sent to destroy him; but the King resolved to sell his life as dear as possible, and kill'd four of the Assassins before he fell himself, which Exton himself effected. Thus died this unhappy Prince at thirty-three Years of Age.

He was, as Historians relate, the handsomest Monarch in the World; kind and magnificent, but soft, timid, little Genius, and too great a Slave to his Favourites.

## HOUSE of LANCASTER.

### HENRY IV. surnamed Bolingbroke.

This Prince, who swayed the Scepter after the deposition of Richard II. began his Reign the 30th of September 1399. He was Son to John of Gaunt, third Son of Edward III.

His chief Character was an extreme Desire of reigning, and he came to the Throne by a Method that was universally disapproved, having caused King Richard to be murdered; which will be an eternal Blot to his Memory.

He performed very few Actions which merit any Eulogium; and his Reign was a continual Series of Revolutions. 'Tis said that he died of a Leprosy the 20th March, 1413; being the 14th of his Reign, and 40th of his Age; but some Writers say he died of an Apoplexy.

### HENRY V. surnamed of Monmouth.

HENRY V. eldest Son to Henry IV. by Mary de Bohun, Daughter of Humphry Earl of Hereford, was born at Monmouth, and was made Prince of Wales Anno 1399 and began his Reign 1413.

He was well-shaped, and warlike; an experienced Soldier, and a great Politician; of an extensive Genius in laying his Schemes, which never failed to succeed. He was a great Friend to Justice, he obeyed its Dictates and made others do so likewise: He was devout without Ostentation, and a great Protector of the Church and Clergy; but a little ambitious; not liberal, and inclined to Cruelty; and in his Father's Time had led a dissolute Life.

He died of a Bloody-Flux in Vincennes, August, 31, 22, in the 34th Year of his Age, after a triumphant reign of nine Years and five Months. He left only one son, brought him by Catherine his Queen.

### HENRY VI. surnam'd of Windsor.

This Prince was but nine Months old when he ascended the Throne. He was born at Windsor, December 6, 21.

He was a just, chaste, temperate, and pious Prince; and resign'd himself wholly to the Dispensations of Providence. He bore with uncommon Patience all the sinister Accidents of Life. His only Defect was a Sort of Weakness of Mind, which render'd him incapable of governing his Kingdom, without the Assistance of others.

He was dethron'd in the Year 1461; but recovered his Crown in 1471; and in 1472 lost it again, together with his Life.

After this Misfortune of being dethron'd, King Henry, Queen his Consort, and the Prince of Wales his Son, fled to Scotland, and was respectfully received in that Kingdom: But the Year following return'd to England, in hopes of concealing himself there; not daring to reside openly in Scotland, being in dread that the Scots would deliver him up; but unfortunately was discover'd and seized, carried to London, and sent to the Tower; where Edward (his own Security) sacrificed him in the 50th Year of his Age.

### EDWARD IV.

Edward IV. Son to Richard Duke of York, was crown'd the 29, 1472, after King Henry's being dethron'd: And notwithstanding he was of a surprizing active, vigilant, warlike Disposition, he was no sooner invested with Royal Dignity, than he devoted himself intirely to his pleasures.

He was one of the handsomest Men in all Europe. Philistinus Commynes pretends that he died through Grief, because Lewis the 11th prefer'd the Alliance of the House of Austria to that of his Family; but this is not probable. He have accused his Brother the Duke of Gloucester of poisoning him: But the most likely Circumstance is, that

his indulging himself at a Banquet too much, occasion'd his Death; for it threw him into a violent Fever, of which he died April 9. 1483. in the forty-second Year of his Age and twenty-third of his Reign.

### EDWARD V.

This unfortunate Prince was but twelve Years of Age when he began to reign; which lasted but two Months and twelve Days; himself, and his Brother the Duke of York being both murder'd by the Protector, Richard Duke of Gloucester, their Uncle, who afterwards usurped the Crown.

They were lodg'd in the Tower, where it was custom for the Kings of England to reside before their Coronation and the Protector, upon the Refusal made by Sir Robert Brackenbury, Lieutenant of the Tower, to be an Accessory to so barbarous a Scene of Villainy, gave the Government of it, for one Night only, to Sir James Tyrrel, who had suborn'd one Miles Forest, and John Dighton, who in the Dead of Night, enter'd the Chamber where the two Princes lay, and stifled them. These shocking Circumstances were told by Tyrrel, who was afterwards executed under the Reign of Henry the Seventh.

### RICHARD III.

This inhuman Wretch was, by the Consent of the People, crown'd King in 1483; and though his Character well enough known by his abominable Actions, I shall describe him as follows:

He was little in Stature, very ugly, and crook'd-back; a great Impostor, Dissembler, Hypocrite, and cruel in Nature; but at the same Time was brave and sagacious and caused Justice to be administer'd to all his Subjects without Distinction. He was greatly skill'd in Politicks and had a surprizing Command over himself in concealing his Intentions.

He was kill'd in the Battle of Bosworth-Field, which was fought against the Earl of Richmond, the 22d of August 1485, who was afterwards King of England.

His Body, after it was found, was carried to Leicester and expos'd to View for two Days; then buried with

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any Ceremony : But Henry the Seventh, some Time after caused a Monument to be erected over his Grave.

### H E N R Y VII.

After the Death of King Richard, the Earl of Richmond was crown'd King of England ; Richard leaving no legitimate Issue.

He was an able Prince ; chaste, and temperate ; an Enemy to all scandalous Vices ; assiduous in Exercises of Piety ; and caused Justice to be administer'd wherein his private Interest was not concern'd ; for he was insatiably covetous ; yet he merited the Esteem of all Europe.

He died the 22d of April, 1509, of a Consumption, in the 52d Year of his Age, and 24th of his Reign ; and was interr'd in that magnificent Chapel which he erected in Westminster-Abbey, called Henry the Seventh's Chapel.

### H E N R Y VIII.

Henry VIII. succeeded his Father Henry VII. and began his Reign April 22, 1509 being in the 18th Year of his Age.

He was a comely Prince ; but grew too corpulent in the latter Part of his Life. He was skilful in all bodily Exercises ; brave without Ostentation ; of a candid and frank Disposition, and liberal to Excess. He lov'd Study, and made a great Progress in the Sciences ; perfect Master of Musick ; and skilled in Philosophy and Divinity : But, on the other Hand, was inclin'd to Cruelty ; and withal, very presumptuous and lascivious.

He died of a Complication of Humours falling upon an old Sore in his Leg, the 28th of January, 1547, in the 56th Year of his Age, and 38th of his Reign. He left behind him two Daughters and one Son ; Mary, by Catherine of Arragon ; Elizabeth, by Anna Boleyn ; and Edward, by Lady Jane Seymour.

### E D W A R D VI.

This Prince began his Reign in 1547, and though but ten Years old, was well skill'd in the Latin and French Tongues ; and had also some Knowledge of the Greek, Spanish, and Italian.



He was a great Promoter of Trade and Learning, and an Encourager of the Reformation; confirming the Grant of the King his Father, to the City of London, for Christ Church and St. Bartholomew's Hospitals; and founded himself those of Bridewell and St. Thomas's, besides several Schools: But a Consumption carried him off the 6th of July, 1553, in the 16<sup>th</sup> Year of his Age, and 6<sup>th</sup> of his Reign.

## M A R Y.

This Princess came to the Throne after the Death of King Edward her Brother. After her Coronation, she was espoused to Philip II. King of Spain, by whom she had no Issue.

She was extremely bigotted to the Romish Religion, which she would have undoubtedly re-established, had she surviv'd.

Her natural Disposition was cruel and revengeful; and we meet with but one good Action during her Reign, viz. Her rejecting the Proposal offer'd by the Spanish Ambassador, of making herself absolute.

She died of a Dropsy the 17th of November, 1558, in the 43<sup>d</sup> Year of her Age, and in the sixth Year of her Reign.

## E L I Z A B E T H.

After the Decease of Queen Mary, the Princess Elizabeth, her Sister, ascended the Throne, in the 25<sup>th</sup> Year of her Age, 1558. She was tolerably handsome, and had most majestick Air; but the Circumstance that endeared her most to the common People, was a certain Affability, which was natural to her, and which won her the Affection of the People.

She was Mistress of a great deal of Wit, as well as of solid Judgment, join'd to great Oeconomy; Learned, and spoke several Languages; a great Politician, and never disclosed any of her Secrets, not even to her Favourites or chief Ministers, who always paid an implicit Obedience to her Dictates: But the Circumstance, which above all ought to gain her Esteem, is, her making the English to enjoy a Felicity unknown to their Ancestors.

She was never married; her Policy, and Love for Liberty, made her entertain an Aversion to the wedded State.

She died March 24, 1603, in the 70th Year of her Age, and 45th of her Reign.

J A M E S I.

James the Sixth of Scotland, and First of England, Son the unfortunate Queen of Scots, succeeded Queen Elizabeth. He was born at Edinburgh Castle, and baptized a Roman Catholick June 19, 1566, but afterwards educated the Protestant Religion.

He was a learned Prince; but made not a right Use of Knowledge. He was naturally as pacific, as Queen Elizabeth was magnanimous.

A little before his Coronation, an intended Conspiracy was discover'd, viz. to raise to the Throne Arabella Stuart, Cousin German; and some of the Conspirators were executed; the famous Sir Walter Raleigh was accused of being concern'd in it; and after a Confinement of twelve years in the Tower, was beheaded Oct. 29, 1618.

The King died at his Palace at Theobald's of a Tertian Plague, after three Weeks Illness, March 27, 1625, in the 58th Year of his Age, the 22d of his Reign over Great-Britain, and 58th over Scotland.

C H A R L E S I.

This Prince, Son to King James, by Anne, Daughter Frederick II. King of Spain, succeeded him. He was born in Scotland, November 19, 1600, and crown'd King of Great-Britain February 2, 1625-6.

Some Writers say, he was religious, chaste, sober, affable, and courteous; of great Penetration, solid Judgment, and an excellent Man. On the other Hand, that he was too fond of Prerogative, and so weak, as to let himself be govern'd by his Wife and Favourites; and that, by their Persuasions, he executed several Things, which first seduced his Subjects to murmur, and afterwards to break out into open Rebellion, which in the End proved fatal to him. He was brought to the Bar as a common Criminal, and sentenced (without being suffer'd to plead in his own Defence)

fence) to be beheaded; which Sentence was executed three Days after it was pass'd upon him, being January 30, 1648-9. He suffer'd Death with great Constancy, and without discovering the least Signs of Weakness or Surprize. And after his Body had been expos'd to publick View several Days, in one of the Apartments at Whitehall, was carried to Windsor, and interr'd in St. George's Chapel.

From the Death of this King until the Year 1661 there was an Interregnum; and England was govern'd by the Parliament, which was compos'd of 144 Persons, known by the Name of Barebone's Parliament; Oliver Cromwell being at the Head: But they resigning the Administration of Affairs, Oliver caus'd himself to be proclaim'd Protector of England, Scotland, and Ireland; and after having established his Authority upon the Ruins of the Parliament, (who were his Creatures) and made the Protectorate hereditary in his Family; after refusing the Crown, which the same Parliament offer'd him, he died of a Tertian Ague Sept. 3, 1658.

It was allow'd by all, that he was a renowned Warrior, great Politician; and Terror to France, Spain, and the United Provinces.

After his Death his Son Richard was proclaim'd Protector; but he did not long preserve this Title; for in the Year 1660, Charles, Son to the deceased King, was restor'd to the Crown.

## C H A R L E S . I I .

This Prince was crown'd April 23, 1661, being St. George's Day. He was liberal even to Prodigality; extremely affable, and so easy in Conversation, that he seem'd desirous of doing Good to all. To this was added a sprightly Wit, and wonderful Conception; and understood the Interest of his Kingdom better than any of his Ministers: But on the other Hand, he was too great a Lover of Ease; and he was justly blam'd for having too great an Attachment to the Fair Sex.

He died February 6, 1684-5, aged fifty-four Years, after having reign'd near twenty-four since his Restoration. And tho' he openly profess'd the Protestant Religion, he never

nevertheless died (according to some Authors) a Roman Catholic.

JAMES II.

King Charles leaving no legitimate Issue by Catherine his Queen, Daughter to Don Juan fourth King of Portugal, his Brother James Duke of York was proclaim'd King. He was born at St. James's October 14, 1633, and crown'd April 23, 1685.

Historians, who have writ impartially, say, that he was a kind Father, a tender Husband, a good Master; and would have been a good King, had he not been misled by the wicked Ministers about him: That as his most bitter Enemies cannot deny, but he shew'd great Bravery on several Occasions when Duke of York; so his best Friends confess, that he had more Piety than Resolution, when King of England: In a Word, that the Religion he profess'd was the Source of his Misfortunes, and the chief Cause of his being dethron'd.

He died at St. Germain's in France, Sept. 6, 1701, in the 68th Year of his Age.

WILLIAM III. and MARY II.

After King James abdicated the Crown, William Nassau Prince of Orange, and his Consort Mary, Daughter to King James, were proclaim'd King and Queen of Great-Britain, the 13th of February, 1688-9, to the inexpressible Joy of the judicious and unbigotted Part of the Kingdom; and were crown'd the 11th of April following at Westminster, with great Magnificence. On December 28, 1694, Queen Mary died of the Small Pox.

Her Piety was solid; and an uncommon Goodness adorn'd her Soul. She had a great Sweetness of Temper, accompany'd with Majesty; and an Air of Grandeur, without the least Pride or Affectation. Her Conduct was admirable; and entertain'd a sincere Affection for the King her Husband, which he as kindly return'd. She paid an intire Submission to the Divine Will, which she gave convincing proofs of in her expiring Moments; as indeed she had done, in the whole Tenor of her Life.

The

The King died March 8, 1701-2, at Kensington-Palace in the 52d Year of Age, and 14th of his Reign.

He was of a middling Stature, and a little round-shoulder'd; had an oval Face, a light brown Complexion, and a Roman Nose; his Eyes lively, and piercing; and new look'd so well as on Horse-Back; as though Nature had form'd him to command in the Field. But the Defects of his Body were compensated by the Perfections of his Mind being endued with a quick, ready, attentive and penetrating Genius: Of sound Judgment; admirable Fore-cast; a strong Memory, and a calm and intrepid Courage. War was his greatest Delight; and Hunting and Shooting his usual Diversions. In a Word, he was one of the greatest Men of his Age. He had declared himself, on all Occasions, an Enemy to Tyranny and Oppression; and, after having preserv'd his own Country, was the Deliverer of England, and the Defender of the Liberties of Europe.

#### A N N E.

This Princess, after the Death of King William and Queen Mary her Sister (they leaving no Issue) was proclaim'd and crown'd Queen of England, &c. and on the 21st of May, 1701-2, declar'd his Royal Highness George Prince of Denmark (her Royal Consort) Lord High Admiral of England and Ireland.

This Queen, instead of calming all Europe, which was her Intentions, involv'd herself in numberless domestic Troubles, which soon brought her to the Grave; being seiz'd with a Kind of Lethargy, she expir'd on the First August 1714, on which Day the Elector of Hanover was proclaim'd King.

She was virtuous, charitable, and a perfect Model of Piety; and as a Sovereign, easy, kind, and generous. Her Majesty was extremely regretted by her Subjects who had loved her with filial Affection during the whole Course of her Reign. She left no Children, though she had six two Sons and four Daughters.

#### G E O R G E I.

This Prince, was the eldest Son of Ernest Augustus, first Duke and Elector of Brunswick Lunenburgh, by Princess Sophia



phia Daughter to Frederick, fifth Elector Palatine, and King of Bohemia, and Princess Elizabeth, eldest Daughter King James the First.

He was born the 28th of May, 1660; succeeded his Father in the Electorate 1698, and was at Hanover at the Death of the Queen, and proclaim'd King of England, the same Day.

He embark'd for England, with the Prince Royal his Son, the 16th of September, 1714, and landed at Greenwich the 18th; and on the 20th made a magnificent Entrance into London; being attended by above 200 Coaches and Six, belonging to the Nobility, &c. The Lord Mayor and Aldermen of London attending in their Formalities.

His Majesty, in his last Visit to Hanover was taken ill on the Road between Delden and Linden; which Illness proceeded from having eat Part of a Melon, which he did not well digest. Being arrived at Linden, he was let Blood: But his Majesty being anxious to reach his Dominions, travelled on, though he was importuned to the contrary, being much indisposed: But being seiz'd, as he rode in his Coach, with a Lethargic Disorder, he reclin'd his Head on a Gentleman, who had the Honour to be with him, and died at the same Time in French, C'est fait de moy, that I am gone, or, it is over with me: However, about Ten Days after he arrived at his Brother's, the Duke of York, at Osnaburg; and after having again been let Blood, expired about One next Morning, June 11, 1727, in the 67th Year of his Age, and 13th of his Reign.

## GEORGE II.

As his late Majesty died Abroad, his Death was not known till the 14th of June, 1727, and his Majesty King George II. was, the next Morning, proclaimed King, and with his Queen were crowned at Westminster on the 20th of October.

His Majesty found the Nation engaged in a War with the Spaniards; but in 1729, a Peace was concluded at the Treaty of Madrid between Great Britain, France and Spain.

On October 29, 1739, War was declared against Spain; and on November 22, 1740, Admiral Vernon, with six Ships, took Porto Bello.

Commodore

Commodore Anson sailed from England with five Men of War in 1740, and after having suffered the most dreadful Distresses, surprised and took Paita on the 12th November, 1741, and having plundered and burnt the Town, and seiz'd several Spanish Ships, he on his Return by the Way of the East Indies, took the Manilla Gallies loaded with Treasure. He arrived in England in 1744 with the Riches he had acquired from the Spaniards amounting to about 400,000 l.

In 1744 War was declared against France; and in 1745 the People of New England, assisted by ten Men of War under Commodore Warren, took Cape Breton, with the Loss of only 100 men; but were afterwards obliged to part with it for Madras.

On the 14th of July the young Pretender sailed to Scotland in a small Frigate, and landed there on the 27th July. He soon obtained a considerable Force, and proceeding through several Parts of Scotland, had his Father proclaimed King, while he himself assumed the Title of Prince of Wales. He took several Places, and gained some Advantages over the King's Forces sent against him; but at length the Duke of Cumberland went to Edinburgh, took the Command of the Army, and on the 16th April came to an Engagement near Culloden House, obtained a complete Victory, in which about 1400 of the Rebels were killed, wounded and taken Prisoners, though the Royal Army had only 60 Men killed, and 280 wounded. The Earl of Kilmarnock, Lord Balmerino, Lord Lovat, and Mr. Radcliffe, Brother to the late Earl of Radcliffe, were afterwards beheaded for this Rebellion on Tower-hill.

Hostilities, at length, ceased in Flanders, and a general Peace was proclaimed in London, February 2, 1763. The French, however, soon broke the Peace by erecting Forts on the Back of the British Settlements in America, and in 1754, attempted to seize Nova Scotia: These predations brought on several Engagements which were attended with various Success.

Mean while the French landed 16,000 Men in Minorca, which was defended by Gen. Blakeney. His Majesty declared War against France on the 17th of May, 1756, and sent Admiral Byng with a strong Fleet to the Relief of

he neglecting to fulfil his Instructions, the Place was  
and he was tried and shot at Portsmouth.

During these Transactions Col. Clive distinguished  
himself in the East Indies; and all the Towns and Facto-  
ries belonging to the French on the Coast of Coromandel,  
except only Pondicherry, were in a few Years taken by the  
English.

In 1758 the Duke of Marlborough landing near St.  
Malo in France, burnt many Ships, with a great Quantity  
of Naval Stores. Lieut. Gen. Bligh and Capt. (now Lord)  
Anson took Cherburgh and demolished its Fortifications.  
Afterwards Capt. Marsh took Senegal, and Com. Keppel  
took the Island of Goree, on the Coast of Africa. On  
the 26th of July, Cape Breton was again taken by Gen.  
Amherst and Adm. Boscawen. Soon after Fort Frontenac  
was rendered to Lieut. Gen. Bradstreet and Fort du  
Roi to Gen. Forbes.

On May 1, 1759, the valuable Island of Guadeloupe  
was rendered to the English, and the same Month Mariga-  
ny, Santos, and Desseada, became subject to England.  
In the same Year the French lost Quebec, the Capital of  
Canada.

In 1760 Thurot landing with three Frigates in the Bay  
of Carickfergus, they were all taken by Capt. Elliot.  
On Sept. 8, Montreal and all Canada submitted to the  
English. But after these glorious Conquests his Majesty  
King George II. to the inexpressible Grief of his People,  
died at Kensington, on the 25th of October, in the 77th  
Year of his Age and the 34th of his Reign; and the next  
Day his present most gracious Majesty was proclaimed King  
in the Name of George III.

The Reign of George II. was distinguished by a Variety  
of important Events, and chequered with a Vicissitude of  
Character and Fortune. He was in Person rather lower  
than the middle-Size, well shaped, erect, with Eyes re-  
markably prominent, a high Nose, and fair Complexion.  
In his Disposition he is said to have been hasty, prone to  
anger, especially in his Youth, yet soon appeased; other-  
wise mild, moderate, and humane; in his Way of Living  
temperate, regular, and so methodical in every Branch of  
Private Economy, that his Attention descended to Objects  
which a great King (perhaps) had better overlook. He

was

was fond of military Pomp and Parade; and person brave. He loved War as a Soldier; he studied it as Science; and corresponded on the Subject with some the greatest Officers whom Germany had produced. The Extent of his Understanding, and the Splendor of his Virtue, we shall not presume to ascertain, nor attempt to play; we rather wish for Opportunities to expatiate on Munificence and Liberality; his generous Regard to Genius and Learning; his royal Encouragement and Protection of those Arts, by which a Nation is at once benefited and adorned.



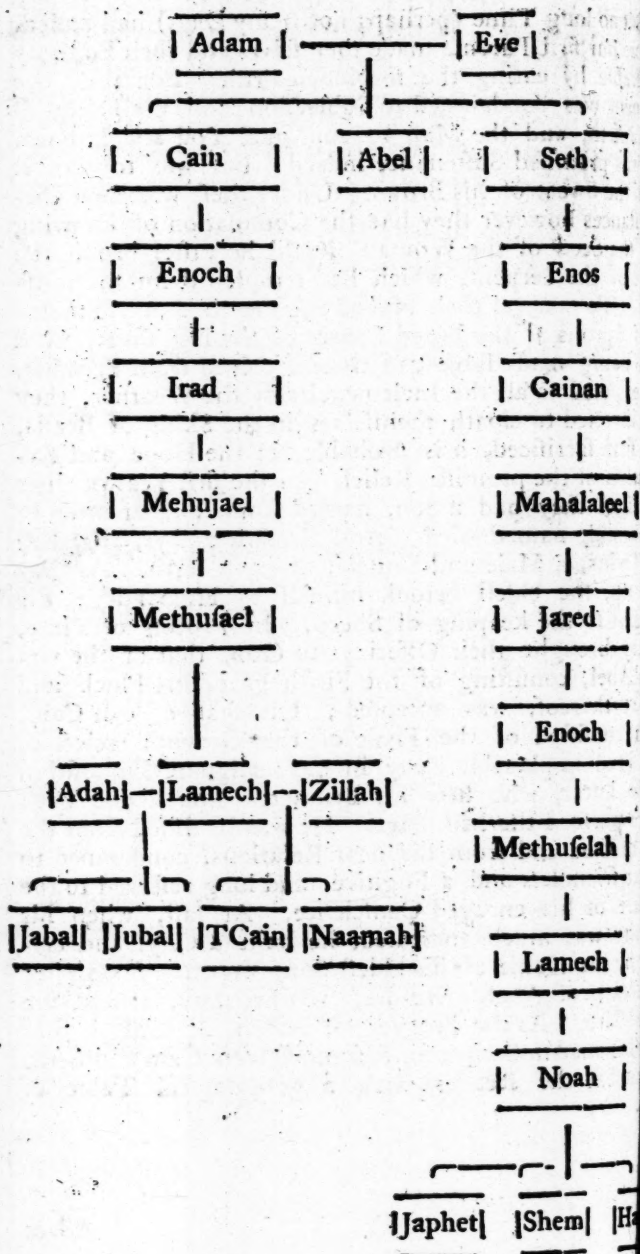
*A short HISTORY of the WORLD, from the Creation  
the Rise of the Assyrian Empire.*

ON the Evening of the sixth Day the Creation was completed, as we have seen before, by the Formation of Man. The two first Institutions given to him were those of Marriage and the Observation of the Sabbath. His first Sabbath-Day was the first Day of his Life. This was followed by six common Days, and then returned. Thus the first Division of Time was into Days and Weeks, and the Return of the Sabbath ascertained the last. This therefore was the first Day of the Week, and the precedent Day of the Christian Sabbath. Another was afterwards appointed to the Jews, to distinguish them from the Nations who had desecrated the original Sabbath to idolatrous Purposes.

To complete his Happiness, his gracious Creator prepared for him an Habitation in Eden; a Garden or Paradise, supplied with all Things necessary, convenient, and pleasurable. In the Midst of it were two Trees of peculiar Nature; the one called the Tree of Life, capable of inducing Immortality, the other called the Tree of Knowledge of Good and Evil, capable of inducing a quite contrary Effect upon the human Species. Of the last he was therefore forbidden to taste, and assured by God, that Death would and should be the penal Consequence of Disobedience.

But no long Time (perhaps not many Days) had passed, before our first Parents made themselves and their Posterity miserable by eating the forbidden Fruit. For this, the Woman was condemned to Subjection and the Pangs of Childbirth, and the Man to continual Toil and Labour. He was promised Sustenance indeed; but was to earn it with the Sweat of his Brows. Under these wretched Circumstances however they had the Consolation of knowing that the Seed of the Woman should hereafter bruise the Head of the Serpent, which had tempted them to transgress. To conceal their Nakedness they had made themselves Aprons of the broad Leaves of the Fig Tree. And now, being made subject to Death, driven from Paradise, and exposed to all the Inclemencies of the Weather, they were directed to cloath themselves in the Skins of Beasts, now first sacrificed, it is probable, in the Hope and Expectation of the promised Relief. In the first Year of their Marriage they had a Son, named Cain, and another in the second, named Abel. And Tradition says, that Eve had Twins, a Male and Female, at every Birth. As they grew up, the eldest betook himself to Husbandry; the youngest to the keeping of Sheep. In Process of Time, they brought their Offerings to God, that of the virtuous Abel, consisting of the Firstlings of his Flock and Fat thereof, was accepted; but that of evil Cain, which consisted of the Fruit of the Ground, rejected. This bred implacable Envy in the malignant Disposition of the latter, who slew his Brother. The divine Vengeance pursued the Murderer. He was banished from the Presence of God and from his near Relations, condemned to be a friendless and a Fugitive, and long reserved to the Torture of his enraged Conscience. At last, when his Posterity was much increased, he built a City, and called it by the Name of his eldest Son, Enoch. Soon after the Death of Abel, Eve had another Son, whom she named Seth. As the Progeny of Adam, at least all that is mentioned in Scripture, descended from Cain and Seth, I present the Reader with a genealogical Table of





Little is said in Scripture concerning the Posterity of Cain. There is a Tradition that himself was killed by Lamech, his own Descendant. 'Tis said that, being used to wander in the Woods, he one Day sat down in a Thicket to rest himself; that Lamech in hunting, attended by a youth who informed him that there was Something in the bushes which he took to be a wild Beast, let fly an Arrow and struck him to the Heart; and that, on the Discovery of his Error, in a Rage he slew the young Man also. This is said to be the Meaning of his Complaint, *I have slain a Man to my wounding and a young Man to my Hurt. If Cain shall be avenged sevenfold, truly Lamech seventy and sevenfold.* Jabal was the first that fed Herds in the Deserts, dwelling in Tents and removing from Place to Place. Jubal invented Music; Tubal-Cain the Art of forging and working Metals; and his Sister Naamah, as is supposed, Spinning and Weaving. They are represented, by Josephus and others, as a wicked and reprobate Race, and were thought to be intended by Moses, when he speaks of *Men, and the Daughters of Men*, in Contradistinction to the Family of Seth, who are called *the Sons of God*.

In the Year of the World 235 Seth had a Son, named Enos. About which Time this Line of Adam began to worship God in a more solemn and public Manner than before. Of the three next, as well as of Methuselah and Lamech, nothing more is recorded than their Ages. Enoch, the Son of Jared, was favoured by God for his most exemplary Piety, and translated to Heaven.

Adam, after he had seen a numerous Posterity and 930 Years, paid that Debt to which he had wilfully subjected himself and them. It is reasonable to believe that he had repented of his Transgression and made his Peace with God. He is said to have outlived him ten Years; but of this nothing positive can be determined. The Progeny of Seth, according to the Oriental Tradition, inhabited the Mountain where Adam was buried, living, upon the Fruits which grew there, in great Purity of Manners. Their only Oath was, *by the Blood of Abel*. Every Day they worshipped God upon the Summit of the Mountain, and visited the Body of Adam, as a Means of procuring the Divine Blessing. Their lofty Situation led them to the Contemplation of the heavenly Bodies, and brought in the

Science of Astronomy. How long their Religion and Virtue continued is doubtful. The Origin of their Corruption must be dated from their Intermarriages with the Family of Cain. These gradually debauched their Morals till at last *the Wickedness of Man was very great in the Earth, and every Imagination of the Thoughts of his Heart was only Evil continually.* Yet in the Height of this Profaneness and Immorality God was mercifully pleased to allow them an hundred and twenty Years of Probation after which he declared, that he would *no longer strive with Man*, in vain Endeavours to reclaim them from their sinful Course of Life.

One Man however was found just and perfect in his Generation, *walking with God.* This was Noah, the Son of Lamech; who, during the whole Term allowed them, attempted by his continual Admonitions to awaken them to Repentance. All this being to no Purpose, *repented God that he had made Man upon the Earth, and grieved him at his Heart.* But Noah and his Family, who had found Grace in the Eyes of the Lord, having been apprized of the Divine Intention to bring a Flood of Waters upon the Earth, and directed to build an Ark or Vessel capable of containing himself and them, with all necessary Provisions, and Animals of every Sort sufficient for Sacrifice and the Renewal of the several Species, escaped by God's peculiar Favour the impending Destruction. In the Year of the World 1656, he and they entered into the Ark. And while the Rest of Mankind continued *eating and drinking* immersed in all Manner of Vice and Sensuality, and deaf to the Voice of Reason and of God, *Flood came and swept them all away.*

But before we close this Part of the History, it may not be amiss to lay before the Reader

*Chronological TABLE of the Years of the Antediluvian Patriarchs, according to the Hebrew Computation.*

|                  | Years of<br>the World | Years of Seth | Years of Enos | Years of Cainan | Years of Mahalaleel | Years of Jared | Years of Enoch | Years of Methuselah | Years of Lamech | Years of Noah |
|------------------|-----------------------|---------------|---------------|-----------------|---------------------|----------------|----------------|---------------------|-----------------|---------------|
| Adam created     | 1                     |               |               |                 |                     |                |                |                     |                 |               |
| Seth born        | 130                   |               |               |                 |                     |                |                |                     |                 |               |
| Enos born        | 235                   | 105           |               |                 |                     |                |                |                     |                 |               |
| Cainan born      | 325                   | 195           | 60            |                 |                     |                |                |                     |                 |               |
| Mahalaleel born  | 395                   | 265           | 160           | 70              |                     |                |                |                     |                 |               |
| Jared born       | 460                   | 330           | 225           | 135             | 65                  |                |                |                     |                 |               |
| Enoch born       | 622                   | 492           | 387           | 297             | 227                 | 162            |                |                     |                 |               |
| Methuselah born  | 687                   | 557           | 452           | 362             | 414                 | 227            | 65             |                     |                 |               |
| Lamech born      | 874                   | 744           | 639           | 549             | 470                 | 414            | 252            | 187                 |                 |               |
| Adam dies        | 930                   | 800           | 695           | 605             | 527                 | 470            | 308            | 243                 | 56              |               |
| Enoch translated | 987                   | 857           | 752           | 662             | 582                 | 527            | 365            | 300                 | 113             |               |
| Seth dies        | 1042                  | 912           | 807           | 717             | 596                 | 582            |                | 355                 | 168             |               |
| Noah born        | 1056                  |               | 821           | 731             | 680                 | 596            |                | 369                 | 182             |               |
| Enos dies        | 1140                  |               | 905           | 817             | 775                 | 680            |                | 453                 | 266             | 84            |
| Cainan dies      | 1235                  |               |               | 910             | 830                 | 775            |                | 548                 | 361             | 179           |
| Mahalaleel dies  | 1290                  |               |               |                 | 962                 | 830            |                | 603                 | 416             | 234           |
| Jared dies       | 1422                  |               |               |                 |                     | 962            |                | 735                 | 548             | 366           |
| Enoch born       | 1556                  |               |               |                 |                     |                |                | 869                 | 682             | 500           |
| Methuselah born  | 1558                  |               |               |                 |                     |                |                | 871                 | 684             | 502           |
| Lamech dies      | 1651                  |               |               |                 |                     |                |                | 964                 | 777             | 595           |
| Methuselah dies  | 1656                  |               |               |                 |                     |                |                | 969                 |                 | 600           |
| The Flood        |                       |               |               |                 |                     |                |                |                     |                 |               |

All the Fountains of the great Deep were broken up, the Windows of Heaven were opened and the Rain descended continually for forty Days and forty Nights. The Earth was covered, and the Surface of the Waves was fifteen Cubits, or seven and twenty Feet, above the Tops of the highest Mountains. Hence a general Destruction ensued, only Noah and his Family, and the Animals with them, being saved. This Family consisted of eight Persons, Noah, with his three Sons, and their four Wives.

The Flood began on the Seventh of December, and the Waters gradually encreased for five Months: There were no Storms or violent Commotions; but the Ark was carried gently along. Then God caused a Wind to pass over the Earth, and the Waters began to assuage. On the Sixth of May they subsided so much, that the Ark rested on the Mountains of Ararat; and by the Nineteenth of July the Tops of the Mountains began to appear. About the Twenty-eighth of August, Noah let out a Raven, which returned not. He therefore sent out a Dove, which quickly returned, having found no Place dry enough to rest on. Being sent out again a Week after, she came back in the Evening, bringing an Olive Leaf in her Bill. Seven Days after, being dispatched again, she returned no more. On the Twenty-third of October Noah removed the Covering of the Ark, and saw that the Surface of the Earth was cleared of the Water. Yet he continued in it till the Eighteenth of December, when by God's Direction, he and all that were with him came out and visited the Earth once more. He built an Altar immediately, and offered a burnt Sacrifice. God accepted his Offering, blessed him, and gave him Permission to eat Animal Food, as well as the Fruits of the Earth; only commanding him to abstain from the Blood, and by that Means to shed that of Man. He assured him that the World should no more be drowned, and promised, as a Token thereof, to set his Bow in the Clouds when it rained:

Descending from the Mountain, Noah applied himself to Husbandry, and planted a Vineyard. Having drank too freely of the Wine, he lay uncovered in his Tent, and was so found by his Son Ham, who called his Brethren, Shem and Japhet, to behold the Posture of his Father. But they, from a Sense of modest Duty, took a Garment, and, going backward, covered him. When he knew what had passed, he blessed them; but cursed Ham in his Posterity, who were to serve their Brethren. At the Birth of Peleg, in the 101st Year after the Flood, when his Posterity began to be numerous, he ordered his Sons to disperse themselves to more distant Habitations. To Shem he gave the Right of Primogeniture for his Posterity, with all Asia to the North and East of the Tigris, and



as the Persian Sea. To Japhet he allotted all between the Tigris and the Euphrates; and to Ham all the Country South of the Euphrates. The Sons of Shem soon took Possession. Arphaxad settled in the fruitful Country East of the Tigris and Babylon. Lud inhabited the Country of Lydia. Elam went Southward into Persia. Shur seated himself in the Country called from him Assyria. Aram went farther Westward on the North Side of the Tigris. Ham and Japhet, with their Descendants, in their Way to the Countries allotted them, stopped at Babylon, where they resolved to tarry, and set about the building the famous Tower of Babel. Being providentially prevented from thence, they went quietly to the Parts allotted for them: The Sons of Japhet between the Tigris and Euphrates. The Sons of Ham thus settled; Canaan in the Land so called: Mizraim in Egypt: Phut still farther in Africa; and Cush in Arabia by the Red Sea. At this last soon invaded Persia on the other Side the Tigris, where he dwelt, and called it Chuzestan. Here he built Erec and Accad. And his Son, called Nimrod, the Rebel, seized upon Babylon. As he was the Son of Cush, the first Invader of Countries, and imitated his Father's Temper, the Eastern Inhabitants called him Nin, which, in Hebrew, signifies a Son; the Greeks Νινος, and the Latins Nirus. After this he possessed himself of Nineveh, higher up on the Tigris, and belonging to Arphaxad. On this Peleg, the Great Grandson of Arphaxad, came into Mesopotamia; where he built a City, which the Greeks called Pholga. Having secured these Conquests, he marched into the Country of Assur, which from him afterwards named Assyria. The Inhabitants, who fled before him over the Tigris, drove out the Posterity of Japhet; so that this Part of the Country also was afterwards called Assyria, as being now inhabited by the Sons of Assur. Upon this, Nimrod built several Cities in the Country thus conquered, particularly Nineveh, which signifies the Habitation of Nin or Ninus. After this he invaded the Country of Aram, farther up on the Tigris, the Inhabitants of which fled before him. These were the Beginnings of the Assyrian Monarchy about the Year after the Flood 289. Nimrod died in the Year after the Flood 341, according to Mr. Marshal's Chronological Tables.

Tables. We give it as a particular and private Conjecture of our own, that his Wife, who usurped the Government at his Death, was a Daughter of Aram and the Grand Daughter of Shem, from a Composition of which Names her own was formed, being called SEMIRAMIS.



*A Short HISTORY of the four GREAT MONARCHIES*

*Of the ASSYRIAN MONARCHY.*

**N**INUS was the first of the Assyrian Kings who enlarged his Dominions by Conquest. He subdued the greatest Part of Asia, and raised Assyria to the Title of an Empire. At his Decease, his Wife Semiramis, a masculine Woman, took upon her the Government, counterfeiting the Person of Ninyas, his Son. She therefore wore the Habit of a Man, and being like her Son, passed for him, as the lawful Successor, unsuspected. She enlarged the Conquests of her Husband, spread her Empire from India to Ethiopia, and was the Foundress of the great City of Babylon. She was slain and succeeded by her Son Ninyas, whom she had personated; and who was remarkable for Nothing so much as his Effeminacy. Neglecting the Affairs of War, he spent all his Time amongst Concubines. The same Stain adheres to his Successor down to Sardanapalus. In the Death of this last King the Course of the Assyrian Monarchy was for a Time interrupted. The Governors assumed the Régál Authority in their respective Provinces. That of Babylon is of most Note, however, as it first restor'd the broken Empire to Unity, and its ancient Grandeur. Though many Kings, unnoted in History, the Monarchy at length descended to Merodach Baladan; in whose Time happened that wonderful retrogradation of the Sun, mentioned by the Hebrew Writers and others. The Astronomers of that Age were of Opinion, that the Motion of the Earth being granted its going back would solve the Appearance better and more natural Way, than by supposing the Sun, Stars, and whole prodigious Frame of Heaven to be roll'd backward.

the same was observ'd, with respect to the Question of the  
man's standing still, which was then revived. Arkianus  
succeeded Baladan. In his Time Ecbatan was built. Then  
came Belithus, Aphronadius, Rigibelus, Messismordacus;  
the Kingdom was again translated to the Assyrians, in the  
Reign of Esarhaddon. In his Time Chaldeon was built  
by the Thracians. After him came Soasdachinus, Chy-  
rianus, Nabopolassar. This last once more raised the  
Kingdom of Babylon to Universal Monarchy. He sub-  
dued Syria, Phœnicia, Judea, Egypt; and expelled the  
Ethiopians from Asia. He was succeeded by his Son Ne-  
buchadnezzar, in whose Reign the Great Cyrus was  
born.

This Monarch besieged and took Jerusalem, burnt  
it to the Ground, razed the Walls, and carried the  
Inhabitants and their Wealth captive to Babylon.  
Having conquered all the neighbouring Nations,  
he new-built the City of his Residence, and enclosed  
it with three Walls. He made those pensile Gardens  
which are so greatly celebrated; and reared those brazen  
Statues which were esteemed amongst the Wonders of the  
World. Puffed up with Vanity, and ascribing the Glory  
of his Magnificence to his own Arm and Power, he was  
condemned to consort with the Beasts for seven Years,  
which he spent in the Desarts of Arabia. The Inhabi-  
tants of that Country shew the Places of his wild Haunt  
to this Day, by Tradition from their Ancestors. At the  
end of this Term he was restored to Reason and his  
Throne, and died peaceably in the Year of the World  
424, and the 43d of his Reign. After him came Evil-  
merodach, Neriglissor, Laborosoarchad, and Labingius.  
Under the last Reign was the War between the Babylonians  
and Persians commanded by Cyrus. After many success-  
ful Campaigns, this young Conqueror laid Siege to Baby-  
lon, took the City, and translated the Empire to the Medes  
and Persians.

*Of the PERSIAN MONARCHY.*

Cyrus, for his Transactions, surnamed the Great, ex-  
tended his Conquests throughout the West of Asia, adding  
the Part of Greece and the Island of Cyprus to his Em-  
pire, and died at the Age of seventy Years, after having  
united

united Media and Persia. Cambyfes, his eldest Son, succeeded, who conquered all Egypt, and carried many Thousands into Captivity; amongst the rest, Pythagoras the Philosopher. He meditated also the Conquest of Ethiopia, and marched towards it with a great Army. Fifty thousand of his Men being buried in the Sands of the Desarts, and the Remainder reduced by Famine to the eating of human Flesh, he returned to Memphis in Humour. Here he slew the sacred Bull Apis and murdered the Priests. He put to Death his own Brother and his Wife afterwards, because she mourned. He slew Prexaspes with an Arrow, and caused twelve Persian Nobles to be buried alive. He set Fire to the Temple blasphemed the Gods, and was at last killed with his own Sword by Accident. After his Death the Magi looked out one of their own Order, whom they set on a Throne, pretending him to be Smerdis, the young Son of Cyrus, who had been murdered by the Command of his Brother. The Fraud was discovered by Ostan, Persian Prince, by Means of his Daughter, who was one of the royal Concubines. She by his Instruction found out that the King had no Ears. This was a convincing Argument that he was one of the Magi, whose Ears had been cut off by the Order of Cambydes. Six other Princes joined in a Conspiracy. They rushed into the Palace, and slew all the Magi, choosing by Lot one of their own Number to be King. This fell to Darius; who finding himself curbed by those who had been his Competitors, had them all treacherously suffocated at an entertainment. He then managed Affairs without Controul, ruling all the Provinces of Asia from India to Ethiopia above an hundred Kingdoms. He fitted out a vast Fleet and sailed into the Mediterranean and Archipelago, reducing the Islands, Chalcedon and all the Cities along the Hellespont and Propontis, with Byzantium itself. After a prosperous Reign of thirty-six Years, he left his Son Xerxes to succeed him.

This was the Son of Atossa, the Daughter of Cyrus. He suppressed the Insurrections in Egypt, and then prepared a Fleet of 4200 Ships, on Board of which were about 500,000 Men. His Land Army consisted of 2,500,000 Soldiers, of several Nations. With these he marched

gainst the Greeks. He dug a Passage through Mount Athos, that his Ships could sail two a-breast; and built a Bridge of Boats over the Hellespont. But the Bridge was broken by a Storm. He therefore executed the Workmen, scourged the Sea with Whips, and had a Chain thrown into it in Token of its Subjection. He then refused another to be made, over which he marched his Forces. In their Way they drank the Rivers dry. Leonidas, King of Sparta, ventured to dispute their Passage at the Streights of Thermopelæ with 4000 Men, and died gallantly with all his Followers, except one; after having made prodigious Slaughter of the Enemy. At Salamis they lost 500 Ships and a considerable Part of the Army. This, with other Disasters, so terrified the Monarch, that he speeded back to the Hellespont, which he crossed in a small Fishing-Boat; leaving Mardonius to command the Forces in Greece. But at Platea they were routed by Pausanias, above 200,000 slain, their Camp taken, and their Navy burnt. Xerxes, on hearing this, fled homewards, by the Way of setting Fire to the Temples of Asia, none of which he spared but the magnificent one of Diana at Ephesus. He was at last killed in his Bed with his eldest Son, by the Captain of his Guard, assisted by the Chamberlain and other Conspirators, and Artaxerxes reigned in his Stead. To him fled Themistocles, the Athenian, whom he highly honoured. Not long after, the Persians lost two hundred Ships in a Fight with the Greeks, and were routed at Land by the Stratagem of Cimon, the Grecian General. Themistocles, being now commissioned against his Country, chose rather to die. As he sacrificed a Bull upon his March, he drank a Bowl of the Blood, and fell dead before the Altar. Their next War was with Egypt, where in a Battle near Memphis they lost an hundred thousand Men: But obtaining fresh Recruits, they found Means to dry up the River Nile, in which lay 200 Athenian Ships confederate with the Egyptians, which were set on Fire by the Athenians themselves, who returned Home with Disgrace. After this a Peace was concluded between the Greeks and Persians, which was soon followed by one that was universal, and which lasted to the first Year of the 87th Olympiad; when the Peloponesian War began.

In



In 4th Year of the 88th Olympiad Artaxerxes died, and his Son Xerxes began to reign; but after one Year was murdered and succeeded, by his Brother Secundarius. He also was soon dispatched by his Brother Darius. Nothing very important in History happened to Persia during his Reign. He was succeeded by his eldest Son Artaxerxes who sent for his Brother Cyrus, surnamed in History the Younger, put him in Manacles of Gold with a Design to make him away, but at the Intercession of his Mother released him again and restored him to his Government in Lydia. Cyrus then made Preparations in earnest to depose his Brother. The two Armies met, in the Neighborhood of Babylon. Cyrus was defeated and slain; but Artaxerxes was wounded. Parisatis, the Mother of Cyrus, to revenge the Death of her Son, caused those who wounded him, to be put to Death with lingering Torments; and inviting Artaxerxes' Queen to a Feast, divided a Bird with a Knife poisoned on one Side, giving the envenomed Part to Statira, and eating the other herself: So that the Queen died in horrible Torture. Artaxerxes himself died of Grief for the Loss of his Son Arfames, whom Ochus his Brother had caused to be murdered, because his Father was passionately fond of him. This Prince was surnamed Mnemon for his extraordinary Memory. He was 94 Years old, and had reigned 40 Years. He was succeeded by his Son Ochus, who assumed the Name of Artaxerxes. The Provinces of Asia Minor immediately revolted and confederated for their mutual Defence; but were betrayed by their own Commander Datames, Governor of Cappadocia, held out for some Time, but was at last murdered by one of his own Intimates. Ochus was excessively cruel. He slew all the Princes of the Royal Family, with the same Barbarity he treated all who gave him any Umbrage, sparing none of the Nobility whom he suspected of Disaffection. Artabazus, one of his Governors, fell off and was for some while successful, through the Assistance of the Athenians first, and then of the Thebans; but being deserted by both, he was afterwards defeated and fled to Philip, King of Macedon. This Defection was followed by that of the Sidonians, who drove the Persians out of Phoenicia. The Cypriots joined in the Revolt, and were

Assisted by the Egyptians. Ochus marched in Person against the Phœnicians. Sidon was betrayed to him and totally destroyed. He took Jerico and carried many Jews into Captivity. He compromised Matters with the Cypriot Kings and confirmed them in their Governments. He then reduced Egypt, plundered the Temples, slew the Bull Apis and carried off the sacred Records. Bagoas, his favourite Eunuch, who was himself an Egyptian, watched for an Opportunity of revenging this Insult on his Country and Religion. By the Help of the King's Physician, he gave him, when sick, a Dose of Poison instead of Physic, in the 21st Year of his Reign. Nor did his Revenge stop here. He kept the Body of his Master, having buried another for it, and because the King had caused his Attendants to eat the Flesh of Apis, he cut his Flesh in Pieces, and gave it to the Cats, making of his Bones Handles for Swords. He then placed Arsēs, the youngest of the King's Sons on the Throne, murdering all the Rest, and usurping himself the whole Power and Authority of the Government. After this, finding that the King was taking Measures for his Punishment, he put him to Death with his whole Family, in the 2d Year of his Reign. He then raised Darius, who before was named Codomannus, to the Throne; but seeing that he would not be entirely ruled by him, he provided a poisonous Potion for him also. Darius, acquainted with, or suspecting his Design, when he brought it, made Bagoas himself drink it. His Government was then established at Home.

He was a Prince of a mild and generous Disposition, of personal Bravery, and in Form and Stature the completest Man in the Empire: But was scarce seated on the Throne, when he found a powerful Enemy Abroad preparing to drive him from it. This was Alexander of Macedon, afterwards surnamed the Great. This Prince, having settled his Affairs in Greece, passed the Hellespont, with the Head of 30,000 Foot and about 5000 Horse. With these inconsiderable Forces, compared with those of Persia, he defeated Darius in three pitched Battles. The unfortunate Monarch was treacherously slain in his Flight by Artabazus, one of his own Nobles; whereby Alexander became Sovereign of the East, and an End was put to the

Persian Empire (after it had lasted 200 Years, under Kings) 330 Years before CHRIST.

*Of the MACEDONIAN EMPIRE.*

On the Death of Darius, all his Commanders submitted to the Conqueror, except Bessus, who, flying into Bactria, there assumed the Regal Title. The next Spring Alexander marched against him. He took the two strongest Cities of the Province, and Bessus retired into Sogdiana, and to prevent Pursuit, burnt all the Boats upon the River, which was no where fordable, and the Country destitute of Timber. But Alexander passed it upon Hides, which had covered the Soldiers Tents and Carriages, filled with Straw and tied together. When the Bactrians heard that he was still in full March after the Spitamenes, whom Bessus principally trusted, with Gananes and Dataphernes, seized on him, tore off his Diadem and Robes, and delivered him bound and stark-naked to Alexander. He caused the Traitor's Nose and Ears to be cut off, and presented him to Oxatres, the Brother of Darius, who had his Limbs fastened to strong Branches of Trees bent down to the Ground, which were then suffered to return and, dismembering, dispatch him effectually.

The Macedonians, having conquered every Difficulty, now sunk hastily into the Luxury of the Persians. Alexander himself endeavoured to blend the Customs of Asiatics and Greeks. He preserved the Persian Polity and the Macedonian Discipline. He caused 30,000 Boys of the Provinces to be instructed in the Greek Tongue and educated so as occasionally to fill up the Phalanx and conferred Governments and Offices indifferently to his new and old Subjects. But these last, who had dreamed of possessing the Wealth and ruling absolutely the Persians, could not relish these Proceedings. A Conspiracy was formed against him; but it was seasonably discovered. Dymnus, the Contriver of it, slew himself, and Philotas was publicly tried and executed. His Brother Parmenio likewise, though he was then in Macedonia, suffered by Order from the King. Amyntas, Attalus, Symmyas, and Polemon, were acquitted. After this, Alexander picked out all whom he imagined to be disaffected in the Army, and disposed them into one Corps,

g them the turbulent Battalion, and appointed Leonidas command it. By these Means he hoped to confine the contagion. For his further Security, he also appointed two Generals of the auxiliary Horse: These were Hephæstion and Clytus.

After the Surrender of Bessus, Alexander continued his march to Maracanda, the Capital of Sogdia, and thence to the Jaxartes. Here some Macedonian Horse were surprised by the Barbarians, who then, to the Number of between 20 and 30,000, retired to a steep Rock, and hence repulsed the Macedonians more than once. The King was wounded, yet at length prevailed, and not more than 8000 of the Enemy escaped the Slaughter. Soon after, the conquered Scythians took Arms, and joined the discontented Bactrians and Sogdians. But their Cities were taken by Assault; though the neighbouring Scythians made an Irruption at the same Time, and it was reported that Spitamenes had besieged the Garrison left at Maracanda. Thither he sent Relief, and built here a citadel to curb the Enemy. He then gave them Battle, and won it with Difficulty. After which he granted them peace on their own Terms.

Meantime the Succours sent to Maracanda were defeated by Spitamenes. He then marched thither himself, raised the Siege, and thence to Zariaspa, where he pitched his Army into Winter Quarters. This Year the King was debauched by a Debauch killed his Friend and Companion Clytus in his own Hand, for using some degrading Expressions to him. Of which, when he came to himself, he deeply repented, and it was long before he would receive Comfort. When the Qualm was over, he aspired to divine Honours; and at a Banquet appointed for the Purpose Anaxarchus in his Speech proposed the Adoration of him; which he refused in Form. This much displeased the Macedonians. A new Conspiracy was now framed by several noble Youths, who constantly attended his Person; and who engaged to assassinate him in his Sleep. But the King, happening to wake all that Night, escaped the Danger. Next Day the Conspiracy was discovered, and the Conspirators were stoned by the Army. Callisthenes, the Philosopher was apprehended on this Occasion; but what became of him, is not finally determin'd.

256 *Of the four Great Monarchies.*

When the Season for Action came on, he re-entered Sogdia, where a Body of his Forces were cut off, but the Barbarians, being afterwards defeated by Cænus, slew the Leader Spitamenes, and sent his Head to Alexander. The Sogdian Rock was the last Resource of the Rebels that remained. This was at length taken, the Macedonians having secretly scaled it by Ropes fastened to their iron Tree Pins, which they drove into the Rock. He then marched into the Country of the Paratacæ, where a strong Fort of the same Nature submitted; and Catenes and Austanes the only Persons now in Arms, were routed by Craterus, the one slain and the other taken. He therefore determined to proceed towards the Indus; and crossing the Mountains took many Cities, and gained two Victories in the Field. The strong Rock Aornus gave him some Trouble, but was at length taken. He then passed the Indus, being joined by Taxiles, a Prince of the Country, and advanced towards Porus, who waited for him on the farther Bank of the Hydaspes. This River he crossed notwithstanding, by a Stratagem; and defeated that Monarch, who behaved gallantly, and lost two of his Sons in the Action. The Conqueror treated him generously, restored him to Liberty and his Kingdom, augmented with several Provinces. To perpetuate the Memory of his Victory, he built a City on each Side the River, called the one Nicæa, and the other Bucephala from his Horse Bucephalus who died here. Three Nations of the Indians were now confederated against him; but he forced their Camp, stormed and razed their City of Sangala; and prepared to pass the River Hyphasis, in quest of new Enemies. But in this he was opposed by the whole Army. Being forced therefore to turn, he built a Fleet and fell down the River Indus. In this Voyage he lost several Vessels and was himself in Danger. He then landed and reduced the Malli, taking their City and Castle. In the Attack of the last, he was much wounded and saved only by the Courage and Resolution of his Men. The Oxydracæ then submitted. He then augmented his Fleet; built another City at the Confluence of two great Rivers; and continued his Voyage. Arriving in the Territory of Musicanus, he received the Submission of that Prince, and built a Castle in his Country. He then invaded the Dominions of Oxycanus, took



of his chief Cities and the King himself. Musicanus, who had revolted, and was now taken Prisoner, he ordered to be crucified, with all his Brachmans. Sailing on, he entered the Ocean by one of the Mouths of that great River and very narrowly escaped Shipwreck. Returning, he entered it by the other Mouth, looked out a safe Bay for his Fleet to ride in, sunk Pits of fresh Water for its Use, and having given his last Instructions to Nearchus his Admiral, set out on his March to Babylon by Land. In this route they endured the greatest Hardships and Miseries, till they came to the Capital of Gedrosia. In Caramania they were plentifully refreshed. Here the King removed and executed several of his Commanders for Mal-Administration. Marching on to Pasargadae, he found the Tomb of Cyrus rifled, and in vain made diligent Enquiry after the Perpetrators of this Sacrilege. Orsines, the Governor of Persia, had grievously oppressed the People. Him, on the Proof, he ordered to be crucified. Baryaxes, the Mede, also suffered for Rebellion. As he passed through Persepolis, he expressed great Concern for having laid that noble Residence in Ruins. In this Progress, Calanus, an Indian Philosopher, who accompanied the King, finding himself declining by a Flux, petitioned that his Funeral might be prepared, which with Difficulty was granted. When this was done, he had himself carried to the Top of it, where taking an affectionate Leave of his Friends, he stretched himself at Length, and remained without Voice or Motion in the Midst of the Flames. At Susa Abulites and his Son Oxathres were put to Death for Mal-Administration. The King then gave an extraordinary Loose to Pleasure after his Fatigues; and effectually to unite his old and new Subjects, took himself two Wives, Barsine or Statira, the Daughter of Darius, and Drypatis, the Daughter of Ochus. Drypetis, another Daughter of Darius, he gave to Hephæstion. Amastrine, Niece of the late King, married Craterus; and to eighty of his Friends he gave Women of the greatest Quality, with suitable Fortunes. A List was also taken of the Officers and Soldiers who had married Asiatic Wives. They amounted to ten Thousand; yet he gratified each according to his Rank. He next paid all the Debts of the Army, and rewarded the principal Commanders, who had distinguished

distinguished themselves, with Crowns of Gold. He reviewed the 30,000 Youths, whom he had ordered to be taught the Macedonian Discipline, and was highly satisfied with their fine Appearance; giving them the Name Epigonoï, or Successors. He then gave the Command of the heavy armed Troops to Hephæstion, with Orders to march to the Banks of the Tigris; while himself should fall down to the Ocean in a Fleet, with the Troops which he had retained. When he came to the Ocean, he steered his Course to the Tigris, and sailed up to the Camp of Hephæstion. At Opis he issued an Edict for the voluntary Discharge of those who were infirm, or weary of the Service, with great Encouragement for such as should remain. This, which was calculated to please, unexpectedly inflamed the Soldiery. They all demanded their Discharge, told him to *take his dancing Boys and conquer Nations*; and some had the Insolence to say, *that his Father Ammon and he might go and subdue the World by themselves*.

On this Occasion the King was not wanting to himself. He leaped from his Tribunal, and calling to his Guards made them seize thirteen of the Ringleaders, whom he commanded them to put to Death upon the Spot. This terrified the rest. He then resumed his Seat, and, in an eloquent Speech, justified his own Conduct and shewed the Folly of theirs. When the Assembly broke up, he retired to his Palace, and for two Days neither put on his Robes nor admitted any of his Friends. On the third, he called the Persian Nobility round him, promoted them to the principal Commands in the Army, and permitted those who were related to him by Marriage to kiss him. The Macedonians saw this and stood like Statues. But when afterwards they were told that a Persian Army was forming upon the Grecian Model and a Body of Horse of that Nation was to be entitled the Royal Regiment; they ran from the Palace like distracted People, threw down their Arms, offered to deliver up the Authors of the Sedition, and that they would remain there Day and Night till the King had Pity on them. On this he suffered himself to be reconciled to them, and sent home ten thousand Invalids who had all their Pay and each of them a Talent for their Expences. At this Time Harpalus, who had fled once before, took 5000 Talents out of the King's Treasury, and

He raised about 6000 Mercenaries, whom he left at Tana-  
s, and went himself to Athens, whence returning, he  
was killed by Thimbros, one of his Intimates.

The King now marched through Media to Ecbatan;  
here, to his great Concern, his Favourite Hephæstion  
died. In this Neighbourhood he reduced the barbarous  
Mossians, and then proceeded to Babylon. He was cau-  
tioned by the Magi, not to enter the City; or, if he did;  
to enter it with his Face to the East. This he attempted;  
but finding the other Side to be a deep impassable Marsh,  
he was forced to enter it with his Face to the West.  
This, with other Presages, gave him some Uneasiness.  
He wore off, however, in some Time, and he began to  
form great Designs, such as the Conquest of the Arabi-  
ans; the Draining of the Fens of Babylon; making there  
a Basin for a thousand Gallies. For the Execution of these  
schemes, he made some Preparation; directing Enquiry  
to be made concerning the People of Arabia, and the fit-  
test Season for an Invasion; assigning a Number of Ship-  
builders, Architects, and Labourers; passing down the  
Euphrates and examining the Canal Pallacopas, and thence  
to the Arabian Confines, where he built a new City, and  
settled a Colony of Greek Mercenaries.

Returning to Babylon, he found his Army considerably  
reinforced; and received Ambassadors from Greece, who  
presented him with Crowns of Gold. Intending to incor-  
porate the Persian Troops into his grand Army, he as-  
sembled here at a Review, when, being very dry, he quitted  
his Throne for some Refreshment; on which a mean Pri-  
vater immediately seated himself. This was held ominous.  
A few Days after, he feasted his Friends and continued the  
banquet late. A Fever ensued, which gradually encreas-  
ed, and carried him off in ten Days. Thus died Alexander  
the Great, the Glory of whose Actions scarce suffered the  
blemishes of his personal Conduct to be seen. He was  
32 Years and eight Months old; and had reigned twelve  
Years and eight Months. He had three Sons, one named  
Hercules, afterwards murdered by Barsine, the Daughter  
of Artabazus and Widow of Memnon; another named  
Alexander, by Cleophes, an Indian Queen, who succeeded  
his Mother; and a third named also Alexander, born af-  
ter.

ter his Death, by Roxana, the Daughter of Oxyartes. This last had for a Time the Title of King.

Some Days after Alexander's Death, his Brother Arridaeus was saluted King, by the Name of Philip, for the Sake of Popularity, by the Power of Meleager, at the Head of the Macedonian Phalanx, who managed Affairs in his Name. But he was opposed by a considerable Party, headed by Perdiccas; whom, however, being possessed of Babylon and the King's Authority, he sent some Persons to seize. But they were sternly received, and forced to return without their Errand. The Cavalry under Perdiccas, Ptolemy, and the rest, blocked up the City, where Famine began to appear. Vast Numbers from the Country flocked thither for Safety, and Multitudes fled thence for Subsistence; while Confusion appeared in every Part. This induced Meleager and the Phalanx to treat. It was agreed that Arridaeus or Philip should retain the regal Title, and the Authority be vested in the great Officers. Meleager to be considered as the third in Rank. Perdiccas soon gained an Ascendancy over the King, and found Means to take off Meleager. He then called a general Council, wherein it was determined that Arridaeus and the new-born Son of Roxana, named Alexander, were to share the regal Dignity; that Antipater should be Governor and General of the European Provinces; that Craterus should have the Title of Protector; Perdiccas command the Household Troops; that Ptolemy should have Egypt, Libya, and the Part of Arabia bordering thereon, and Cleomenes be his Deputy; Leomedon Syria; Philotas Cilicia; Pithon Media; Eumenes Cappadocia, Paphlagonia, and all the Country along the Euxine Sea, as far as Trapezus. But these were not yet conquered, so that he was a Governor without a Province. Antigonus had Pamphylia, Lycia, and Phrygia Major; Cassander Caria; Menander Lydia; Leonnatus Phrygia on the Hellespont. Thracians, the Chersonese and the adjoining Country, as far as Samothrace, were excepted in the Commission of Antipater, with whom Craterus was to share, and given to Lysimachus. The rest of the Provinces remained under the Governors appointed by the deceased King. This is Arrian's Account. And this Partition had the Sanction of the royal Name; though it was in Fact the absolute Decision of Perdiccas and the other great Officers, who shared,

their Pleasure, the Empire of their late Master, treating his lawful Heirs as Pageants and Cyphers. For no Man adhered to them with a Sense of Duty, but Eumenes, who had been Alexander's Secretary. So that within seven Years Aridæus was murdered, and within so many more his Collegue Alexander, together with his Mother Roxana, shared the same Fate. Eumenes and Pithon were slain by Antigonus, who attempted also to seize Seleucus, who had obtained the Province of Babylon, and to dispossess Ptolemy of Egypt. But Antigonus himself fell in a Battle gained by Seleucus and Lyfimachus. Thus, not content with their respective Shares, they raised Tumults and Insurrections, and involved themselves and their Posterity in most bloody Wars; till at length these dismembered Parts of the Macedonian Empire became in general Provinces of the Roman.

*Of the ROMAN EMPIRE.*

Romulus, the Founder of Rome, was the Grandson of Numitor, King of Alba, who had been dethron'd by his younger Brother Amulius, and the Son of Rhea Sylvia, the Daughter of Numitor, whom her Uncle had consecrated a Vestal, and obliged to perpetual Virginity. But she pretended to have been ravished by a Person in a military Habit, who passed afterwards for the God Mars. Being delivered of Twins, this Romulus and his Brother Remus, she was condemned, and the Children exposed in a wooden Trough upon the River Tiber. They were taken up by Faustus, the King's chief Shepherd, and well educated. When grown up he disclosed to them their Birth and Family. Soon after they slew Amulius and restored Numitor. He bestowed on them the Lands near the River, where they had been bred, and put them at the head of a Colony. The two Brothers differed and Remus the youngest was slain by the Eldest. He now began to build a City, on the 21st Day of April, in the Year of the World 3256, of the Flood 1600, and 748 before Christ. When finished, it consisted of about a Thousand Houses, rather Huts. For his own Palace was thatched and filled with Rushes. From this mean Beginning rose the Mistress of the Nations. The new City was thinly inhabited.



bired. To remedy this Defect, Romulus made, of Grove close by, a Sanctuary for Persons in Distress, and proclaimed it such throughout the neighbouring Countries. Thither flocked an immense Number of Criminals, Debtors, Malecontents and inconstant People. But the greater Part had no Wives. He therefore invited the Sabines and other Neighbours to some Plays, which were to be exhibited in Honour of Neptune. This Novelty took with the Females especially. But on a Signal given, the Romans rushed amongst them, seized every Man his Female and took her to Wife. This produced a War with the Sabines which was at last compromised. Tatius and his Sabine removed to Rome and became a Part of the Colony; which the Founder divided into Tribes, Curies and Decuries; and distinguished the Families into Patrician and Plebeian. He then had a Senate or Grand Council chosen out of the former. Each Tribe elected three; each of the thirty Curies the same Number; in all 99. Himself appointed another who was the Head or Prince of the Senate. The Royal Guard consisted of an hundred Horse. The King took Care of religious Affairs, was the Guardian of the Laws and Customs, decided weightier Causes; convened the Senators; assembled the People; delivered first his own Opinion, and ratified every Decree. In War he had the absolute Command of the Army and the Treasury. The People created Magistrates, enacted Laws and resolved upon any War proposed by the King; and the Senate was to approve of all.

Tatius also formed a Senate of the like Number of his own People, who had the same Privileges. These were afterwards united to the other. Next three Bodies of Equestrians, or Roman Knights, were instituted, and incorporated into the Roman Legions. Each Legion contained 4000 Men. The two Kings reigned jointly and in great Harmony for five Years. They conquered the City of Cameria, and transplanted 4000 of its Inhabitants to Rome. In the sixth Year Tatius was assassinated by the Lavinians. Romulus again defeated the Camerinians, subdued the Fidenates and Veientes, and then applied himself to the making of good Laws. Growing afterwards arbitrary, he was murdered by the Senators, and Numa Pompilius was elected to succeed him. He was of an illustrious

of the famous Sabine Family and had married Tatia, the Daughter of King Tattius. His Reign was not memorable for Battles or Conquests. His chief Study was to prevent and quiet all Contentions at Home, to reform the Manners of the Romans, to establish good Policy in the City and to set Religion, which had hitherto been little regarded, on a respectable Footing. He died sincerely lamented in the eighth-second Year of his Age and the forty-third of his Reign. Tullus Hostilius succeeded. He entered into a War with the Albans, which was decided by a Combat between three Brothers, called the Horatii, on the Roman Side, and an equal Number, named Curiatii, on the Alban. Two of the former were slain, the other unhurt; but the three Alban Brothers were all wounded. On this the Roman pretended Fear and Flight, and being pursued by the Curiatii in such Manner as their Wounds would allow, found Means to attack them separately and slew them all. The Sister of the young Conqueror had been betrothed to one of the Curiatii. On his Return homeward, she therefore met him with Reproaches, and was killed by him on the Spot. For this he was condemned by the Judges, but saved by an Appeal to the People. The King then made a successful War upon the Veientes, tho' they were supported by the Fidenates and privately favoured by the Albans. The last, for their Treachery, had their City demolished, and its Inhabitants were transplanted to Rome. After a Reign of thirty-three Years he left the City greatly enlarged in Compass, and was succeeded by Ancus Marcius, the Grandson of Numa, by his Daughter Pompilia. He endeavoured to restore the religious Ceremonies, which had been neglected in the last Reign, to revive and encourage Husbandry and to cultivate the Arts of Peace. Being attacked upon by the Latins, he razed several of their Cities, removing the Inhabitants to Rome. At different Times he defeated the Fidenates, the Veientes, the Volscians and the Sabines. Rome was greatly enlarged by him and its Dominions extended quite to the Sea, where he built the Port and City of Ostia. He reigned twenty-four Years and was in every Way inferior to any of his Predecessors. Tarquin came next, distinguished in History by the Name of Priscus. He was of Tarquinii in Hetruria, whence he took the Name of Tarquinius on his Removal to Rome. He took  
four

four Cities from the Latins, and with the Spoils built the Great Circus for the Roman Games. He routed the combined Forces of the Heturians, and obtained the Sovereignty of that People. He greatly beautified and improved the City; thrice defeated the Sabines; laid the Foundations of the Capitol; and died by Assassination when he was eighty Years of Age. His Death, however, was concealed for a while. Meantime his Son-in-Law Servius Tullius took upon him the Administration of Justice in his Father's Name, hearing Causes from the Throne with all the Ensigns of Royalty about him. Having by his prudent Management gained the Affections of the People, the King's Death was then declared, and Servius appeared in public with a Guard and every other Mark of Sovereignty, without waiting for the Election of the People. A strong Opposition was intended by the Senators, but his great Popularity secured him.

He subdued the Heturians anew and triumphed. After this he was elected in Form by the People, and continued to govern, though the Senate could never be induced to confirm the Election. He enlarged the City, and added a fourth Tribe to the other three. His two Daughters were married to the Grandsons of the late King, and reduced the rebellious Heturians. He instituted the Census, dividing the Citizens into six Classes, and assessing them according to their Estates. He gave all Freedmen the Choice, either to return to their own Country, or to stay at Rome, with the Privilege of Roman Citizens; and divided those who stayed into four Tribes. He reformed the royal Power, committing the Cognizance of ordinary Suits to the Senate, and reserving only State Crimes to himself. Being grown old, he was at length circumvented and murdered by the Ambition and Cruelty of Tarquin his elder Son-in-Law, and his own Daughter Tullia, Wife of the Younger. These two had engaged in an incestuous Intrigue and had poisoned, he his Wife and her Husband, to make Way for their closer Connexion. They now had the old King dispatched, and the Daughter had Inhumanity enough to drive her Chariot Wheels, the Joy of her Heart, over the Body of her dead Father.

Thus Tarquin, soon afterwards named the Proud, usurp-  
ed the Throne. He kept a strong Guard of Strangers  
about his Person, and exercised an absolute Tyranny. Af-  
fected by the Latins, he defeated the Volscians and sub-  
dued the Sabines. Meanwhile many of the discontented  
Patricians took Refuge at Gabii in Latium, which City  
declared against him. But his Son Sextus, by pretending  
to desert his Father, and bitter Invectives against him, had  
the Art to get himself appointed their Commander in chief,  
and delivered up the Place to him; after having sacrificed  
the principal Persons among the Disaffected. For this Ser-  
vice Sextus was made King of Gabii. Tarquin now  
published the Sybilline Books, and finished the Building of  
the Capitol. He besieged Ardea, the Metropolis of the  
Aurunci. While he was here engaged, his Son Sex-  
tus ravished Lucretia, the Wife of his Kinsman Collatinus,  
the injured Lady, having called her Friends and Relations  
together, laid before them a circumstantial Account of the  
Affair, and, declaring that she would not outlive the Loss  
of her Reputation, stabbed herself before them. This  
kindled a Spirit in the Assembly, which soon communicated  
itself to the Senate and the People. All united in a Reso-  
lution to expel at once the Tarquinian Family and the Re-  
publican Form of Government. This happened in the Year of  
Rome 242.

They now elected two annual Governors by the Title  
of Consuls, Junius Brutus, who had most zealously pro-  
moted the Insurrection, and Collatinus the Husband of  
Lucretia, being first elected to this Dignity. Tarquin  
was abandoned by his Army and effectually excluded.  
Brutus even condemned to Death his own two Sons, for be-  
ing concerned in a Design to restore him, and saw the Exe-  
cution with a steady Countenance. The consular Govern-  
ment continued to the Year of Rome 705 (reckoning to  
the Battle of Pharsalia) with little Interruption, and in the  
full Exercise of Power. The Title indeed existed still un-  
der the Roman Emperors; but it was a Badge of Honour  
sincerely, and the Consuls themselves were as much Slaves  
to the meanest of the People. It would be too tedious  
to relate the various Battles and Encounters within this  
compass of Time between them and the neighbouring Na-  
tions. In the End they always gained the Victory, and  
A a extended

extended the Limits of their Empire far and wide. So extraordinary were the Exploits of this undaunted People that King Pyrrhus exclaimed with Reason, "How easy were it, said he, to obtain the Empire of the World, were I Pyrrhus King of the Romans, or Romans the Soldiers of Pyrrhus." Yet as fast as this victorious People enlarged their Territories abroad; so did their Seditions and Tumults encrease at home. The Frequency of the Wars greatly retarded the Progress of the first. Yet in five hundred Years they had entirely subdued all Italy. Then considering Sicily as a most rich and plentiful Island, only distant, as it were, by some injurious Stroke of Fate from their Continent; they resolve to re-unite it by their Arms. A favourable Opportunity offered. The People of Messina complained of the Tyranny of the Carthaginians. The Romans interposed and disputed with them the Empire of Sicily and the World. Under the Masque of aiding their Friends and Allies, they betook themselves to naval Affairs. The Carthaginians, having lost their Fleets in various Conflicts, their Fortune yielded to that of Rome, which first made Sicily a tributary Province, and then reduced Sardinia and Corsica.

Having thus expelled their Rivals out of the Islands of the Mediterranean Sea, there remained nothing for them to conquer but Afric itself on that Side. There they landed, and in a short Space took above three hundred strong Places; though they met with much Opposition both from Men and Monsters. For a most enormous Serpent, an hundred and twenty Feet long, annoyed the Camp near the River Bagrada. But Regulus, whose victorious Arms neither Men nor Monsters could hitherto resist, made no Stop before he came before the Walls of Carthage. Here Fortune began to desert him, yet so to give only an Occasion for the Roman Virtue still more illustriously to display itself. By the excellent Conduct of Xantippus, a Lacedemonian General, who commanded the Carthaginian Forces, thirty thousand Romans were slain in one Battle, and Regulus himself taken Prisoner. Yet under this great Misfortune he did not lose himself, but preserved to the last an invincible Constancy and Fortitude of Soul. The Carthaginians dispatched him with a Commission to the Roman Senate, to propose a Peace and

Exchange



exchange of Captives. But he dissuaded the Senate from  
markening to these Overtures. He chose rather to return  
to his former Captivity, and endure the worst that his  
enemies could inflict, than to be instrumental to the Dis-  
honour of his Country.

Thus the War was renewed in Sicily, and the Romans  
conquered. To evidence the Greatness of their Victory,  
they shewed an hundred and twenty Elephants taken from  
the Enemy in the Field. This, however, was followed by  
a terrible Overthrow which they suffered at Sea, wherein  
their Navy was sunk and destroyed. Many naval Encoun-  
ters happened with various Success. But in the Consul-  
ship of Lutatius Catulus, all Carthage seemed to appear  
upon the Sea, with the Woods and Forests round about.

This proved its Ruin. The Ships were too magnifi-  
cent and unweildy. The light and expeditious Vessels of  
the Romans attacked them with such Alertness and Advan-  
tage, that the whole Sea between Sardinia and Sicily was  
covered with the Wrecks of this mighty Carthaginian Fleet.  
This obliged them to accept of such Terms as the Ro-  
mans were disposed to grant. The Carthaginian State be-  
ing involved afterwards in domestic Troubles, the Romans  
took undue Advantage of them, which embittered the  
Minds of both and laid the Foundation of another War.  
They were for the present however busied with Teuta  
Queen of Illyria, who was forced to resign Part of her Do-  
minions. They then extended their Conquests against  
the Gauls, even to the Alps. In the 535th Year of the  
City, War was again declared against Carthage. On this,  
Hannibal, the Carthaginian General in Spain, crossed the  
Alps and entered Italy. He won four Battles successively.  
But in this Extremity, the Firmness of Fabius, the Cou-  
rage of Marcellus and the Conduct of Scipio, saved their  
Country from impending Ruin. the Two first kept him  
in Bay in Italy. The last conquered Spain and then passed  
to Africa. This occasioned the Recall of Hannibal,  
and was followed by the Battle of Zama, wherein the Car-  
thaginians were defeated, and forced to submit. The Ro-  
mans then turned their Eyes towards Greece and sent Fla-  
minius against Philip King of Macedon. He reduced the  
Power of that Monarch and restored the Cities of Greece to  
Liberty. Antiochus the Great, King of Syria, was next  
defeated.

defeated both by Sea and Land and obliged to submit to their Terms. Perses, now King of Macedonia, took the Field against them, but was defeated, led Captive in Triumph, and perished in Prison. His Kingdom was reduced to the Form of a Roman Province, and Rome arose upon the Ruins of the Macedonian Empire, in the Year of the City 586. They now a third Time declared War against Carthage, resolving to rid themselves for ever of so formidable a Rival. In the End that City was taken and utterly destroyed. At the same Time the City of Corinth was reduced to Ashes by the Consul Mummius. The fine Statues, Paintings and Works of Art, with which it had been plentifully furnished, were conveyed to Rome, which henceforth began to relish the fine Arts. They were engaged in a War with the Numantines in Spain, who maintained it against them for fourteen Years with very extraordinary Valour. At last when their City was closely besieged, themselves perishing with Famine and unable to hold out longer, collecting all their Substance into the Middle of it, they set Fire to it and consumed themselves, their Families and Effects together. About the same Time a Insurrection of the Slaves in Sicily was with Difficulty quelled. Being now possessed of Italy, Greece and Africa they passed the Alps and settled a Colony in Gaul, called from its Founder Sextius, *Aquæ Sextiæ*, now *Aix* in Provence; subdued the *Saluvians*, defeated the *Allobroges* and made *Narbonese Gaul* a Province. High Differences now arose between the *Patricians* and the oppressed *Peasants*, which proved the Ruin of the two *Gracchi*. These were scarce well over, before the War broke out with *Jugurtha*, King of *Numidia*. After he had greatly harassed the Romans and prevailed more by Money and the Dint of Corruption than of Arms, he was at length taken and led in Triumph by *Marius*, who was seven Times Consul. He also overcame the *Cimbrians* and *Teutons*, who threatened Italy and the Roman Empire with Destruction. Upon the Ruins of *Marius* and his Faction *Sylla* rose, who drove the Great *Mithridates* out of Greece and made himself perpetual Dictator. A great Part of Italy now revolted. This was called the *Italic War* and was not finished, when *Sertorius* created fresh Troubles in Spain. But this great Man, whom *Pompey* could not conquer, was slain by a Conspiracy.

Conspiracy of his own Followers. Lucullus was at this Time successful against Mithridates; and that Prince was finally subdued by Pompey, who reduced Armenia and added Albania, Iberia, Syria and Juden to the Roman Empire; while Cataline at home with his Associates, conspired the Ruin of it. But this was prevented by the Eloquence and Steadiness of Cicero. Yet it was impossible for Rome much longer to support her Liberty. Its Dominion was so vastly enlarged and such an Inundation of new Citizens, by the Enfranchisement of the Italians, gave Scope to the Ambition of the several Leaders, who, pretending the Interest of the Patricians or the People, still promoted their own. Pompey ruled the Senate and its Deliberations. The Wealth of Crassus and his Views were boundless; and the Generosity and Conduct of Cæsar, who now had conquered all Gaul and invaded Germany and Britain, in the highest Estimation. These three therefore entered into a League, joined their Power and Interest, and governed all with absolute Sway. At length Crassus led an Army against the Parthians and was cut off. His Death was followed by a civil War between the other two, and Cæsar was finally victorious in the Battle of Pharsalia. From this Time we may well date the Establishment of Emperors over Rome, under whom the Consuls were only nominal. Much the greater Part of them were Monsters in Tyranny and underwent a Fate suited to their Demerits. These made Rome the Seat of the Imperial Residence till the Reign of Constantine the Great, who in the Year of Christ 312 defeated Maxentius and removed the Imperial Seat to Byzantium in Thrace, called afterwards Constantinople. From this Period Rome gradually decreased till at last it fell, together with the Western Empire; overrun by the Goths, Vandals and other Barbarous Nations. And in the Year 1453, Constantinople itself, and with it the Eastern Empire also, was taken by Mohammed, Sultan of the Turks; whose Posterity possess it still.

*A Course of NATURAL PHILOSOPHY.*

## I.

*Of MATTER and MOTION.*

**M**ATTER is that of which all Bodies are composed, however differently formed. Motion is a Change of Place, either with Respect to the whole Body, as when it is progressive; or with Respect to the particular Parts of it, as when it turns round upon a Centre.

Matter is indifferent to Motion or Rest. But, when put in Motion, as much Force is required to make it rest as was necessary before to put it in Motion.

Matter cannot give to itself either Motion or Rest. Therefore a Body lying still will ever remain so, unless moved by some external Cause: And in Motion, will ever continue so, unless some external Cause stop it; as some other Body striking it in a contrary Direction, its Friction, Rubbing against the Ground, the Resistance of the Air, and the Attraction of the Earth.

Matter in Motion will always move on in a straight Line, unless turned out of it by some external Cause.

The Swiftneſs of Motion is measured by Distance, Place and Length of Time. But its Quantity is measured by its Swiftneſs and the Quantity of Matter moved, taken together. Thus, if one Body be twice as big as another, and yet move equally swift, it has double the Quantity of Motion; and so in Proportion.

All Bodies have a natural Tendency towards each other. This is called Attraction or Gravitation. The less a Body still gravitates or presses towards the Centre of the globe by which it is attracted. This Principle was impressed upon Matter by the Almighty. It is this which makes the different Parts of the Earth cohere, and keeps the Universe in Order. Thus, was a Hole to be opened through the Earth's Body, and a Ball of Stone or Iron to be let fall into the Opening, it would not pass through to the other Side, but would infallibly stop and rest at the Centre. Thus, the Inhabitants of the opposite Side of the Globe to us walk upon its Surface with the same Security that we do.

Besides this general Law of Attraction and Gravitation, which affects all Bodies equally and universally, there are particular Bodies which attract and repel each other. So the Loadstone; does not only direct the Needle of the Compass to the North, but attracts Iron with one End and repels it with the other. Sealing-Wax, Glass, Amber and Precious Stones, rubbed till they are warm, have the same Effect upon Feathers, Hairs, Straw, &c. Hence it is evident that each of these Bodies has a Sphere of Attraction, beyond which it will repel what it would otherwise attract.

When Bodies are attracted by each other so as to stick together and unite, it is called the Power of Cohesion. This binds large Bodies together. For all are made up of atoms or Particles inconcievably small.

Particles of flat or square Surfaces have the strongest Cohesion: Thus two flat Surfaces of Lead, gently pressed together will unite so firmly, as to require considerable Force to separate them. But those of a spherical or round Form adhere less strongly, because they can only touch at certain Point. Hence the Particles of Water or Quick-silver, being globular, are separated with the greatest Ease. Attraction is strongest at the nearest Distance: And in different Distances of the same Bodies, it decreases as the Squares of the Distances encrease. Thus if two Bodies at a Distance attract each other with a certain Force, at half that Distance they will attract each other with four times that Force.

## II.

### *Of the four ELEMENTS, &c.*

Fire, Air, Earth and Water are the constituent Parts of every Body in Nature, and by their mutual Assistance give Rise and Motion to all Things. Without Water, the Earth would scorch up the Earth and destroy both Animals and Plants. Without Fire the Water would become another Form and become solid Ice. Without Air, Fire could not execute its Office; nor could the Water in the Clouds be distributed in friendly Showers for the Nourishment of Plants and Animals; nor would the latter be



be supplied with the Means of Respiration. The Earth too lends her Aid, straining and purifying the Salt-Water from the Sea for the Use both of Vegetables and living Creatures; being the Parent and Sustainer of all, and her Reflection of the Solar Rays warming and cheering them.

These Elements may be drawn, even from dry Wood. Two Sticks violently rubbed together produce Fire. Some Pieces into a Glass Retort over a Furnace, and will obtain both Air and Water. If you then burn Wood to Ashes and wash out the Salts with Water, remaining Part will be pure Earth.

The Air is a light, thin, elastic or springy Body. It is fluid, as Water, but cannot, like it, be congealed into Ice. The Atmosphere is that vast Body of Air, which surrounds the Earth, reaching many Miles above its Surface. This is evident from the Elasticity or Springiness of Air and Weight together. A Column of Air is equal in Weight to a Column of Quicksilver between 29 and 30 Inches high. Quicksilver is near 14 Times heavier than Water. If therefore the Air was as heavy as Water, the Atmosphere would be about 14 Times higher than the Column of Quicksilver, or about 34 Feet. But Air is near a thousand Times lighter than Water; therefore the Atmosphere must be near a thousand Miles high. If you consider further the Elasticity of Air, which, the Pressure of the incumbent Atmosphere being taken off, will dilate itself so as to fill more than 1000 Times the Space it occupied before; the Height of the Atmosphere must be very great. For the Air which is nearest to the Earth is close pressed down by the Weight of that above, and consequently much thicker. As the Weight above gradually lessens; so must the Air be still more and more dilated and light.

But the Air, near the Surface, is not always alike. It is sometimes more rarefied and lighter, than at other Times. Hence the Quicksilver falls in the Barometer, and the Rain descends; the Air below, not being dense enough to support the Weight. For it is the dense or heavy State of the Air below, which raises the Quicksilver in the Barometer, and prevents the Clouds from falling down in Rain.

This elastic Principle in the Air, which renders it liable to Rarefaction and Condensation, has produced

most wonderful Effects. In a Cannon or Musquet, it is the Gunpowder and Fire which expels the Ball with great Velocity; but it is the sudden Rarefaction of the Air in the Chamber of the Gun, by the Explosion of the Gunpowder. Place the same Ball in the same Quantity of Powder in an open Vessel and, when fired, you will scarce see it move. Wind-Guns are charged only with condensed Air and with Ball; yet are so contrived that 6 or 7 Balls may be let off, one after another, each of which would kill a Buck at a considerable Distance. And the sudden Rarefaction of the Air by Fire in the Fowls of the Air is the Cause of Earthquakes and Volcanos.

In this Respect Air differs greatly from Water, which, notwithstanding its Composition of such small Particles as cannot separately be distinguished with a Microscope and its Readiness to rise or be evaporated with Heat and separated with a Touch, yet cannot be brought into a less Compass. The Experiment has been tried by filling a globe full of Water, then closing it up and placing it in a Screw-Press, which was pulled with great Force. Thus it remained till the Water sweated through the Pores of the Globe, and, till that happened, would never give Way. Air is the Medium which diffuses Light to the World. If there was no Atmosphere to refract the Sun's Rays and the Globe, it would be almost as dark by Day as by Night; and the Sun, Moon and Stars would only be visible. It is also the Medium of Sounds. As Air is fluid, as well as Water, these are propagated by Undulation or a waving Motion with amazing Speed: Some say, at the Rate of 1142 Feet in a Second of Time. Eccho is only the Reverberation of Sound. Nor can Sound be conveyed without Air. A Bell, struck in an exhausted Receiver in the Air Pump cannot be heard.

Without Air, neither could Ships sail, or the Birds fly. In an exhausted Receiver a Feather falls with as much Rapidity as a Guinea. But above all, Air preserves Life, since without it we could not breathe. Put an Animal in the Receiver. When the Air is partly exhausted, it will be in great Agony and convulsed. Let more Air be pumped out and it will fall down for dead. But if fresh Air be instantly admitted, it will rush into the Creature's Lungs, restore their Motion and recover him. If fresh Air was blown

blown down the Throat of a Person newly drowned, would probably restore him, and many Lives might be saved by the Practice.

Air, which has lost its Spring by Fire, Foulness or Stagnation, is unfit for Respiration. The Drawing in of Air to the Lungs in the Small Pox, and other inflammatory, putrid and eruptive Fevers, has destroyed many. In all such Cases, it is Madness to deprive a poor sick Person of the fresh Air, without which he could not live even in Health.

Motion is the only Preservative for Air and Water. They both become unwholesome if kept long in a State of Rest. And both may be recovered and made salutary being again put into Motion. The World is therefore highly obliged to Dr. Hales for the Discovery of the Ventilator, which discharges the foul Air from Ships, Prisons and other close Places, and supplies them with fresh.

The Wind is a Stream or Current of Air, as a River of Water, and is occasioned by Rarefactions, or whatever disturbs the Equilibrium of the Air. Nature abhors a Vacuum or Void. When the Air is rarefied in one Place that which is more dense will rush in to supply the Vacuum and preserve the Equilibrium; as in Water and other Fluids. Raise a Vessel of Water suddenly out of a Cistern and see with what Speed the rest rushes in to fill up the Space and preserve the Level. These Rarefactions may happen near the Earth, or much above it. And hence the Clouds fly in contrary Directions.

Winds are violent and gentle, in Proportion to the Rarefaction or Disturbance that occasions them. A great Storm flies at the Rate of 50 or 60 Miles an Hour, and frequently bears down Trees and Houses. What the Seamen call a brisk Wind flies about 15 Miles an Hour, and is of great Use in cooling the Air and cleansing it.

Winds are warm or cold, according to the Quarters from which they blow. Those from the South and South-West are warm: Those from the North and North-East are cold. Some Winds moisten and dissolve: Others dry and thicken. Some raise Rain: Others disperse it. Some blow constantly from one Quarter, and are therefore called the General Trade-Winds. These are met with on each Side of the Equator, in the Atlantic, Ethiopic and Pacific Oceans.

between the Tropics, and to near 24 Degrees of Latitude. They are occasioned either by the Sun's Rotation round his Axis, or by a constant Rarefaction of the Air in those Parts by the Solar Rays, and the denser Air continually coming in from each Hemisphere to maintain the Equilibrium. Again, some Winds blow one Way for one half or one Quarter of the Year, and then the contrary Way. These are met with in the East-Indian Seas, and are called Monsoons, or periodical Trade-Winds. Besides pure Air, the Atmosphere contains minute Particles of different Sorts, continually arising from the Earth and Waters, which are afterwards suspended and kept floating in the Air. The most considerable of these are the small Particles of Water, which are so separated as to be lighter than Air, and are raised by the Sun's Heat, or carried up by the Wind from the Sea, Rivers, Lakes, and marshy or moist Parts of the Earth, and which descend again in Dews, Rain, Hail and Snow. When these small Particles are by a rarified State of the Air suffered to unite, many of them together, and to descend by their Weight so as to make the Hemisphere more opaque, and moisten the Earth upon, it is called a Mist. On the contrary, the small Particles of Water, which arise after a hot Day from Rivers, Lakes and Marshy Places, and by filling the Air thicken Objects and render them less visible, are called Clouds. Clouds are the greatest and most beneficial of all the Meteors. Borne about on the Wings of the Winds they distribute Fatness to the Earth. They contain very small Particles of Water, which are elevated to a considerable Height above the Earth. For a Cloud is only a Mist flying high in the Air; as a Mist is only a Cloud near the Earth. That these Vapours are thus raised in the Air, is evident from what we see in common Distillations. But all Clouds are not composed of watery Vapours only. They are sometimes impregnated with sulphureous and even saline Particles, exhaled from the Earth. The Chymists have experienced that Volatile Bodies will volatilize some fixed Bodies, and carry them off. This is the Case in Thunder and Lightning, which is caused by the Sulphureous and Saline Particles taking Fire and bursting the Cloud with a tremendous Noise, which is preceded by a Flash, resembling

bling that of lighted Gunpowder, only more penetrable which may be owing to its extreme Volatility.

The small Particles of Water frozen in the Air, being they had united into large Drops, form Snow; and Drops of Rain, frozen in the Fall, become Hail.

The Aurora Borealis, or the Northern Lights, are caused by Nitrous and Sulphureous Vapours thinly spread through the Atmosphere above the Clouds. Here they ferment, and, taking Fire, the Explosion of one Particle kindles the next, and so on. The Flashes succeed another, till all the Vapour is set on fire; and the Streets seem to converge towards the Zenith of the Spectator, that Point of the Heavens which is immediately over his Head.

The Ignis-fatuus, sometimes called Will with the Wench and Jack o'Lanthorn, is a fat, unctuous and sulphureous Vapour, which, appearing lucid in the Night and directed about by the Air near the Surface of the Earth, is frequently mistaken for a Light in a Lanthorn. Vapours of this Kind are often kindled in the Air, and some of them appear like falling Stars.

The Rainbow is occasioned by the Refraction and Reflection of the Sun's Beams from the very small Drops of a Rain Cloud or Mist seen in a certain Angle made by two Lines, the one drawn from the Sun and the other from the Eye of the Spectator, to those Drops in the Cloud which reflect the Sun's Beams. So that two Persons looking on a Rainbow at the same Time, do not, in Reality, see the same Rainbow. Halos or Circles, which seem to encompass the Sun and Moon, are of different Colours. They always appear in a Rainy or a Frosty Season, and are caused by the Refraction of Light in the condensed Particles of the Air.

### III.

Of MOUNTAINS, SPRINGS, RIVERS and the SEA.

Some suppose Mountains to have been originally occasioned by the Deluge, before which Time they imagined the Earth to have been a perfect Level. The Flood without Doubt occasioned many of them; yet from their Use



in collecting the Waters of the Atmosphere into Springs  
Rivers, it is reasonable to conclude that there were  
Mountains even in the first Age of the World. However, that  
Earth has undergone amazing Charges, since its first  
formation, is manifest from the Contents of some Moun-  
tains in our own Country. For they abound with Petre-  
factions, Shells of Sea-Fish, and the Bones of foreign  
Animals. At Reading in Berkshire, far distant from the  
Sea, is a Stratum of Oyster-shells, spread through a Hill  
of considerable Extent. They lie upon a Chalky Rock  
or Bed of Sand resembling that of the Sea: While the  
upper Part of the Hill is a loamy Soil, thirty or forty  
Feet perpendicular above them. At Burton in Suffex, was  
discovered the Skeleton of an Elephant. Numberless Curio-  
sities of this Kind have been discovered; yet few but  
may be accounted for from the Effects of the De-  
struction, Earthquakes and subterraneous Fires. Mountains,  
small Islands, with the Fish upon them which have been  
covered by the sandy or loose Earth giving Way and fall-  
en over them, have been thrown up by Earthquakes  
in the Bottom of the Sea. In the Memory of Man,  
an Island, ten Miles in Compass, has been so raised in  
the Archipelago. The Hills of it abound with Oysters,  
yet petrified and much larger than those taken on the  
Shore; whence we may conclude that they were thrown  
up from the deepest Part of the Sea.  
From the amazing Quantity of Fire contained in the  
Earth and the Force of the Subterranean Air rarified  
by, great Alterations must have been made in the  
Face of the Earth, in the Course of so many Years.  
These proceed those burning Mountains, which send up  
Smoke and at the same Time large Stones and metallic  
Substances. One of the most famous of these is *Ætna* in  
Sicily, whose Eruptions of Flame and Smoke are disco-  
vered as far off as the Harbour of Malta, at the Distance  
more than 40 German Miles from the Sicilian Shore.  
It emits Fire and Smoke continually, but sometimes  
with greater Violence. In 1536 it shook all Sicily  
from the first to the twelfth of May. A most horrible  
Rumbling and Cracking was heard, as if great Guns had  
been fired. Many Houses were overthrown throughout  
the Island. Dreadful Chasms appeared in several Places,

Fire and Flame issued with great Vehemence, which four Days consumed and burned up all within Leagues of *Ætna*. Soon after, the Funnel, on the Top of the Mountain, disgorged a vast Quantity of hot Embers, for three Days together. These were not only scattered over the Island, but carried to Italy. Even Ships sailing to Venice, two hundred Leagues off at Sea, suffered Damage.

Mount Hecla, in Iceland, sometimes rages with great Violence, throwing out great Stones. Frequently imprisoned Fire, from Want of Vent, causes most affecting Sounds, like Lamentations and Howlings; where some credulous People think it Hell, where the Wicked are tormented,

Mount Vesuvius, not far from Naples, tho' its Slopes are beautifully planted with most fruitful Vines, is subject to most violent Eruptions. In the Reign of *Vespasian* was one so dreadful, that great Quantities of Ash were not only carried to Rome, but also beyond the Mediterranean, even into Egypt. Birds were suffocated in the Air and fell down dead; and Fishes perished in the Waters, from the Heat which they contracted.

In 1586 a Mountain in Java was shattered to pieces by a violent Eruption of glowing Sulphur, whereby many People are said to have perished. It threw out great Stones for three Days together, with so much Smoke, Flame and hot Embers, that it darkened the Day and turned the Day into Night. There are a great Number more of these in different Parts of the World.

Springs have principally their Origin in the Waters exhaled from the Sea, Rivers, Lakes and marshy Places, forming Clouds which are dispersed by the Winds. When these Clouds are so collected as to become too heavy for the Air, they fall down in Rain. These which are driven aloft in the Air against the Mountains, and to them give up their Contents in small Particles whence soaking into the Crevices and at last meeting together, they form Springs. Hence it is that we have Plenty of Springs in Mountainous Countries, and few in those that are flat. Observe also, it frequently rains in hilly Countries, when it is clear and fine in the Valleys beneath. For the Air in the Valleys is dense enough

support the Clouds and keep them suspended. But when they are driven upon the Mountains, where, in Consequence of the Height, the Air is so much lighter, they ascend in Mists or such small Drops of Rain as will not run off but sink in. That a great Part of this Water is exhaled from the Sea, is known by the extraordinary rains and great Dews which fall upon Islands. But some Springs have their Source from the Ocean, the Water being strained and rendered sweet by the Earth, as it passes. And some, that are near the Sea, are a little salt, or brackish.

The Springs thus formed upon the Mountains and the rain meeting together make little Rivulets or Brooks. These again, uniting, compose large Rivers, which empty themselves into the Sea. Thus the Water, exhaled from the Sea by the Sun, is returned to it again.

But the Mists, Dews and Rains seem insufficient to supply the prodigious Discharge of very large Rivers. We may therefore conjecture that they have some primary Communication with the Sea.

Lakes are Collections of Water contained in the Cavities of the Earth's Surface. Some of these are stagnant, being made up of the waste Water that flows, after Rain or Snow, from the adjacent Countries. These must be wholesome. Other Lakes are supplied by Rivers, the contents of which they receive and then convey underground, to form other Springs and Rivers. Others, again, are fed by the Springs which arise in the Lake itself. And some have a Communication with the Sea, from which they receive their Waters, and afterwards return them by subterraneous Streams.

The Sea is an immense Collection of Waters in the deep Valleys of the Earth. Were there not prodigious Cavities in the Earth to contain this amazing Quantity of Water, thus collected, the whole Surface of the Globe would be overflowed. For the Water, being lighter than the Earth, would be above the Earth; as the Air is above the Water. As the Sea is only a vast Lake, the divine Creator was pleased to endue it with its Saline Quality, to preserve it from Corruption and Stench, that it might be wholesome Nourishment for its Inhabitants, and not prejudicial to the whole of the Earth. It is further purified by that Motion

which is excited by the Winds, and the continual Flux and Reflux of its Waters.

This Flux and Reflux, which we call the Tides, depend upon the different Attractions of the Sun and Moon, which influence this huge Body of Waters. The Solar Attraction is constant and central, raising the Flood highest in the Middle of the Sea. The Lunar is later, drawing it towards the Land, and of the greatest Power about the Time of the new and full Moons, when the Tides are highest.

## IV.

*Of MINERALS, VEGETABLES and ANIMALS.*

Minerals are so called, as being the Production of the Mine; and are divided into fusible and malleable, such as melt, and such as may by Hammering be extended on the Anvil; with Respect to Metals. But Stones, precious and other, Salt, Sulphur, and whatsoever is dug from the Bowels of the Earth, come properly under the same Denomination.

Metals and Stones lie in Beds, where probably they grow. For in the Forest of Dean in Gloucestershire, the best Iron and the most is obtained from the old Cinder melted over again.

Thus we are supplied with Materials for the Formation of all Sorts of Utensils and Instruments; with Gold, Silver and Brass for the Ends of Commerce and Barter; and even with resplendent Gems for Ornament and Shew.

Vegetables or Plants are produced by several Sorts of Earth, as common Mould, Loam, Clay, and Sandy Soil, with the Assistance of Rain, fresh Air and the Solar Warmth. The barren Parts of the Earth are, for the most Part, Sand, Gravel, Chalk and Rocks. For they produce Nothing, unless Earth be mixed with them.

Vegetables may be divided into three Classes, Herbs, Shrubs and Trees. Herbs have their Stalks soft and without Wood; as Parsley, Lettuce, Violets, Pinks, &c. Shrubs, tho' woody, never grow into Trees; but bend down their Branches near the Earth's Surface; as Rose Honeysuckles, Gooseberries, Currants, &c. Trees shoot

in one great Stem and rise a considerable Distance above the Ground, before they shoot out their Branches; as the Oak, the Elm, the Beech, the Ash, &c. They supply us with Timber for Building, and particularly the Oak for Ship-Building; no Timber being so tough, strong and durable as Old English Oak; nor does any Tree perhaps yield more Timber. One was lately cut down belonging to the Bishop of Salisbury and sold for Forty Pounds, which was six Feet two Inches in Diameter, contained twenty Tons of Timber and was supposed to be a thousand Years old.

The Nourishment and Propagation of Plants is truly wonderful. In the first of these, the Earth has not so much to do as is generally imagined. Without Water there would be but little Increase. The dry Earth has been weighed both before and after the Production of Plants, and no sensible Diminution of the Quantity perceived. Let Plants grow in sandy Deserts, where it seldom rains, and in some Measure supply the Want of Water. The Ground-Pine, tho' it seems to grow like a Fungus or Excrescence on the Branch of a Tree, often contains a Pint or Quart of Water for the Refreshment of the Animals in the sultry Climates where it is found. The Nourishment of Plants is received partly by the Fibres of the Roots and hence conveyed into the Branches and Leaves through small Tubes, and then returned by the Bark to the Root again; so that there is a constant Circulation of vital fluids in these as well as in Animals; and partly by the Pores of the Stalk and the Pores of the Leaves, whence they appear to be so greatly refreshed by the Dew.

Fresh Air and the Solar Warmth are also necessary to the growth of Plants. For those that are always confined in a close Room will never rise to Perfection: And when the vegetative Principle has been long checked by Cold; it breaks out with such Force, when warm Weather comes, that, in the cold northern Countries, you may see trees covered with Snow one Week, and with Blossoms the next.

They are propagated different Ways, but the general Method is by Seed. Some however are raised by a Part of the Root set in the Ground, as Potatoes; others by new Plants propagated from the old ones, as Hyacinths and Tulips; others by Layers, as Vines; and others by Graft.



ing and Budding, or Inoculation. But what is mysterious is, the Sex of Plants: Some having both Male and Female Organ in themselves; while others have them distinct, and the one will not flourish and crease without the Assistance of the other. Jovianus Pontanus relates, that in his Time there were two Palm-Trees, the one Male, cultivated at Brindes, the other Female, the Wood of Otrantum, 15 Leagues apart; that the latter was several Years without bearing Fruit, till at length rising above the other Trees of the Forest, so as to see the Male Palm-Tree at Brindes, it began to bear Fruit, in Abundance. M. Geoffroy makes no Doubt, that the Female then only began to bear Fruit, because it was then in Condition to catch on its Branches the Farina of the Male, brought thither by the Wind.

*ANIMALS are naturally divided into MEN and BRUTES.*

Of Men there are four different Sorts, with Respect to Colour. Most of the Europeans, and some of the Americans are white; the Africans, on the Coasts of the Mediterranean are tawney; those of Ethiopia and the Coast of Guinea black; and the original Americans of a red Copper-Colour. Of the vast Multitudes inhabiting the Globe no two are found alike in all Points. This is a wonderful and gracious Providence to prevent Confusion among Mankind. The Number of Persons of each Sex is nearly the same; the Males being somewhat more than the Females, to supply the Exigencies of War and Commerce. Hence Polygamy, or the having many Wives, is unnatural, as well as unlawful.

Brutes are divided into four Classes. I. Aerial winged, as Birds, Wasps, Flies, &c. II. Terrestrial confined to the Earth, as Quadrupeds or four-footed Beasts, Reptiles, which have many Feet; and Serpents, which have none. 3. Aquatic or Inhabitants of the Water, Fish of all Kinds. 4. Amphibious, or such as can live for some Time either on Earth or in Water, as the Seal, Lion, Otter, Alligator, &c.

Yet there are some, which seem to partake of both Kinds, as the Bat, which is Part Beast and Part Bird. And some Reptiles, and some Water-Animals want one

ore of the five Senses with which the Rest are endowed, Worms, Cockles, Oysters, &c.

Insects are so called from a seeming Separation in their Bodies, where they are cut in and only joined by a small Ligament, as in Flies, Wasps, &c. Some of them undergo different Changes, and become in Time quite different Animals. Thus the Silk-Worm assumes various Forms; and the speckled Aurelia becomes a gawdy Butter-Fly. Some Animals may be cut in Pieces, and every separate Piece will soon grow into one entire Animal of the same kind. The Polypus is endowed with this Property.

The Sagacity of other Animals is equally surprizing, and sufficient to lower the Vanity of Man. Thus Beavers invert the Currents of Rivers and build Houses for themselves with Artifice and Foresight. Thus Bees form themselves into Societies under Regal Governments. Thus the Wood-Cock, and the several other Birds of Passage, without the Use of the Compass, sail directly through the pathless Air from one Country to another.

All Animals receive their Food at the Mouth, and most of them chew it there till it is intimately mixed with the Saliva or Spittle, and thereby prepared for Digestion. When the Stomach has digested it, 'tis conveyed into the Bowels, and by their peristaltic or vermicular Motion moved gently through. In the Passage, the Chyle or Milky Juice for Nourishment is separated by the lacteal Veins from the excrementitious Part, and conveyed into the Blood, where it is assimilated or concocted into Blood itself. The Circulation of which is thus performed: The Blood, being by the Vena-cava brought into the right Ventricle of the Heart, is by the Contraction of that Muscle forced into the pulmonary Artery of the Lungs. Here the Air, which we breathe, mixes with and enlivens it. Thence being conveyed by the pulmonary Vein into the left Ventricle of the Heart, the Contraction of the Heart forces it out into the Arteries, which distribute it into all Parts of the Body; whence it returns by the Veins (the Mouths of which are tied over, and as it were tied upon, the Ends of the Arteries) to the right Ventricle of the Heart, to pursue the same Course again; thus communicating Life and Heat to every Part. A Portion of that, which goes to the Head, is separated by the Brain and concocted into Animal

mal Spirits. These are distributed by the Nerves, and im- Sense and Motion throughout the Body. The In-  
 ments of Motion are the Muscles; the Fibres, or  
 Threads, whereof, contracting themselves, move the  
 ferent Parts of the Body. In some of them, this is  
 by the Direction of the Mind, and called Voluntary  
 tion; but where the Mind seems not concerned, it is  
 ed involuntary.

This is the Progress of Animal Life, by which a  
 may, even at home and within himself, contemplate  
 see the Wisdom of God in the Works of the Creation.

## V.

*Of the FIVE SENSES of MAN, and the HUM*  
 UNDERSTANDING.

After this cursory View of Nature, let us examine  
 own Faculties, and see by what Means we acquire  
 treasure up a Knowledge of these Things. This is  
 by Means of the Senses, the Operations of the Mind,  
 the Memory, which is the Storehouse of the Under-  
 ing. Thus when Miss first sees herself in the Glass,  
 thinks that she has found a Play-Mate; having no  
 of the Lineaments of her own Face. But if the Reflec-  
 of the Parent's or the Nurse's Face shall offer, it is  
 sently acknowledged. If in this observing Attitude  
 Father should lay his Hand upon her Head and for-  
 call her his dear Nancy, she then, by her feeling, hear-  
 and at the same Time seeing the Representation of  
 Action, is presently convinced that it is her own Im-  
 This Transaction too is lodged in the Memory, and  
 whenever a Looking-Glass is mentioned, will give back  
 the Mind this Idea of its reflecting Objects. Thus  
 our Ideas are obtained originally by the Senses, and  
 proved by the Operations of the Mind. Whatever  
 Eye or the Ear inform the Imagination of this last is  
 ingenious at painting and presenting to the Memo-  
 When this Information proceeds from the Eye's behold-  
 the very Object, it is called an adequate or real Idea; wh-  
 otherwise, it is termed inadequate or imaginary.

The Sight is the most pleasing of the Senses. The Origin of it is the Eye, which is so contrived for admitting and refracting the Rays of Light, that those which come from the same Object and fall on different Parts of the Pupil, are again brought together at the Bottom of the Eye, and the whole Object painted on the Membrane spread there, which is called the Retina.

The Medium of this Sensation is Light. This may be considered, either as it radiates from luminous Bodies directly to our Eyes, and thus we see those luminous Bodies themselves, as the Sun, a Torch, a Candle, &c. or as it is reflected from other Bodies; and thus we see a Flower, a Man, &c. that is, a Picture reflected from them to our Eyes by the globular Rays of Light.

Bodies, which respect the Light, are of three Sorts. 1. Those that emit the Rays of Light, as the Sun and fixed Stars: These are luminous Bodies. 2. Such as transmit the Rays, as the Air, Window-Glass, &c. These are pellucid.

3. Such as reflect them, as the Moon, the Earth, &c. These are opaque. Observe also, that the Rays of Light are never seen; tho' by their Means we see the Bodies from which they come originally, or are reflected.

Thus we see not the Rays which pass from the Sun to the Moon; but, by their Means, we see the Moon from which they are reflected.

If the Eye be placed directly in the Medium through which the Rays pass to it, the Medium is not seen; for we never see the Air through which the Rays come to our Eyes. If a pellucid Body, as Glass, Spectacles, be placed at a Distance from the Eye, that Body will be seen, as well as the other from which the Rays come that pass through to the Eye. Because the Glass, being a solid Body, reflects some Rays of Light from its Surface, and may therefore be seen by those reflected Rays, at the same Time that the other is by the transmitted Rays.

There are two Kinds of opaque Bodies, viz: those that are not specular, as the Moon, the Earth, a Man, &c. and others that are specular, or Mirrors, that is, Bodies with polished Surfaces, reflecting the Rays as they come from other Objects and shewing us their Images. Rays reflected always bring with them the Idea of Colour. But Colour is nothing more than a Disposition in Bodies to

to reflect to the Eye one Sort of Rays more copiously than others. For particular Rays impress upon the Eye particular Colours. Some are red, others blue, yellow, green &c. Every Body of Light proceeding from the Sun compounded of these various Sorts of Rays. Some of them are more refrangible than others, or more liable to be broken and turned out of their Course as they pass. Hence they will be separated after such Refraction, and their Colours will appear distinct. The most refrangible Rays are the Violet; the Red are least so: The intermediate ones, in Order, are Indigo, blue, green, yellow and orange. Hold a Prism in the Beams of the Sun and you will see the Separation of the Colours with Pleasure, and what we have said before of the Rainbow will be confirmed by the Experiment. Some of these Rays are also reflected as well as refracted, more easily than others. And hence arise all the various Colours of Bodies.

The Whiteness of the Light is owing to a due Mixture of all the original Colours. And Whiteness in other Bodies is a Disposition to reflect all the Colours of Light in the same Proportion, nearly, as they are mixed in the original Rays. Blackness is a Disposition to absorb most of the Rays of every Sort. Hence black Cloaths are warmer than those of any other Colour. And the Inhabitants of hot Countries chuse white, as the cool Light makes its Progress from the Sun to the Earth about seven or eight Minutes.

Hearing is the next Sense; the Organ of which is the Ear. That which it conveys to the Brain is called Sound. The Motion which induces the Perception of Sound is tremulous and waving, properly expressed by Undulation. This we observe in the Strings of musical Instruments, of Bells, which vibrate as long as any Sound comes from them. Sound is propagated at a great Rate, though not so swiftly as Light. For we see the Flash of a Gun long before we hear the Report.

Taste comes next. Its Organs are the Tongue and Palate, but chiefly the first. There is a greater variety of Tastes, than of Names to express them by. What we have are, sweet, sour, bitter, harsh, smooth, rank. Our other Ideas of Taste are conveyed by remembered Similitudes.



Smelling is another Sense, excited by external Bodies; and the Nose is the Organ of it. The Effluvia that fly from those Bodies to our olfactory Nerves excite this Sensation. The power of some Bodies to emit these Effluvia or Steams, is amazing. A Grain of Musk will scent a thousand Rooms, and will continue to do it for a great Number of Years without being spent. Surely these emitted Particles must be very fine; yet they will not pass the Membranes of a bladder; and many of them will scarce find their Way through common white Paper. The Terms that we express Scents by, are those of sweet, stinking, rank, musty and sour. The rest is done by Comparison, or by Epithets borrowed from odoriferous Bodies.

Touch is the Fifth and last Sense. This is spread over the whole Body with the Nerves, which are its Organ. By this we discover whether Things are hard, soft, rough, smooth, wet, dry, &c. But the Qualities which most affect it, are Heat and Cold.

Heat is caused by the Agitation of the insensible Parts of the Body which produces in us that Sensation. So that what is Heat to our Sensation, in the Object is only Motion. Thus a Mill, running round without a proper Supply of Corn, will take Fire; and the Wheel of a Chariot will blaze with the Rapidity of its own Motion; and the Indians produce Flame by rubbing two Pieces of Wood together. Thus as Heat is nothing but the insensible Particles of Bodies put into Motion; so Cold, on the contrary, is occasioned by the Cessation of the Motion of those Particles, or their being placed in a State of Rest.

From the Ideas formed in the Mind, by Means of our Senses, and the Operations of the Mind itself, is the Foundation of the human Understanding; the lowest Degree of which is Perception. To conceive a right Notion of this, we must distinguish the first Objects of it, which are simple Ideas, such as of red, blue, bitter, sweet, &c. from the other Objects of our Senses, and from the Objects of Reflection, such as thinking, willing, &c. The Mind, having gained Variety of simple Ideas, by putting them together, forms compounded or complex Ideas, as of a Man, Horse, Windmill, &c.

The next Operation of the Mind is that of abstracting from Ideas; for thus they are made general. And a general

ral Idea is to be considered as separated from Time and Place, and lodged in the Mind to represent any particular Thing that is conformable to it.

Knowledge is the highest Degree of the speculative Faculties, and consists in the Perception of the Truth affirmative or negative Propositions. And this Perception is immediate or mediate. When, by comparing two Ideas together, we perceive their Agreement or Disagreement as that black is not white, that two and two are equal four, &c. it is called immediate Perception, or intuitive Knowledge; and as the Truth of such Propositions is to be known by a simple Intuition of the Ideas themselves they are also called self-evident Propositions.

But mediate Perception comes by the Intervention of other Ideas. Thus if it be affirmed that the Front of your House is longer than mine, the Agreement or Disagreement will be seen by applying the same Measure to both. This is Demonstration or rational Knowledge.

But the Understanding is not confined to certain Truths. It also judges of Probability; which consists in the likelihood of Agreement or Disagreement of Ideas: And the assenting to any Proposition as probable, or not, is called Opinion.



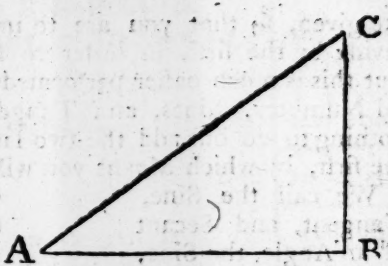
## OF PLAIN TRIGONOMETRY

OR,

### *The Resolution of Right-lined Triangles.*

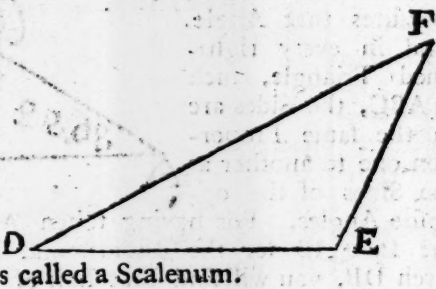
**A** Right-lined Triangle is a Figure contained between three right Lines, which at their Meeting make three Angles. Some call it a plain Triangle. If one of these Angles is a right Angle, that is, if one of these Lines stand perpendicular to another, it is called a right-angled Triangle. But if none of them are right, it is called an oblique-angled Triangle, and if one of these Angles is obtuse, that is, greater than a right Angle, it is called an obtuse-angled Triangle. But if all the Angles are acute, that is, less than right Angles, it is called an acute-angled Triangle.

In the right-lined Triangle ABC, the longest Side AC is called the Hypotenuse, and the other two Sides the Legs; likewise AB is called the Base, because the Triangle seems to stand upon it, and BC the Perpendicular.

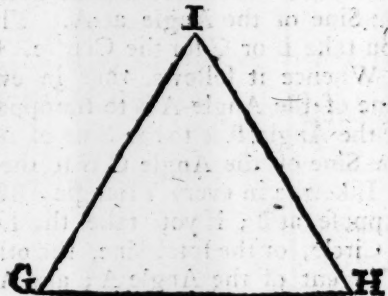


And because BC is perpendicular to AB, it is a right-angled Triangle.

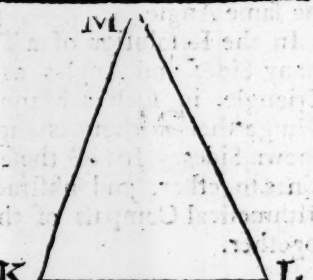
The Triangle DEF is an oblique-angled Triangle. It is likewise called an obtuse-angled Triangle, because the Angle at D is greater than a right Angle. Likewise, as all the three Sides are unequal, it is called a Scalenum.



The Triangle GHI is an acute-angled Triangle, because every Angle is less than a right one; it is also an Equilateral Triangle, because all the Sides are equal.



The Triangle KLM is called Isosceles, because two of the Sides only are equal; as KM is equal to LM.



It is necessary to observe, that all the Angles of every Triangle are equal to two right ones, that is, to twice 90 Degrees.

All Triangles are solved by the Rule of Proportion, in which three known Numbers are

C c

are

are given, so that you are to multiply the two last, and divide by the first, in order to find the Number sought. But this is much easier performed by Logarithms of natural Numbers, Sines, and Tangents, in which you have nothing to do but add the two last together, and subtract the first, by which Means you will have the fourth.

We call the Sine, Tangent, and Secant of an Angle, the Sine, Tangent, and Secant of the Arch which measures that Angle.

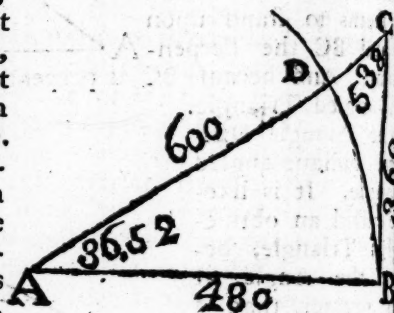
And in every right-lined Triangle, such as ABC, the Sides are in the same Proportion one to another as

the Sines of the opposite Angles. For having taken A as the Centre, with the Line AB for the Radius, and having described the Arch DB, you will find that half of the Chord BD is the Sine of the Angle at A. The same will hold good if you take B or C for the Centre.

Whence it follows, that in every Triangle, ABC, the Sine of the Angle A is to the opposite Side BC, as the Sine of the Angle B is to the opposite Side AC, or the Sine of the Angle C is to the opposite Side AB.

Likewise in every Triangle ABC, which is right-angled suppose at B; if you take the Leg AB for the Radius of a Circle, or the total Sine, the other Leg, BC, will be the Tangent of the Angle A; and AC will be the Secant of the same Angle.

In the Resolution of a Triangle we ought to know many Sides and Angles as are necessary to determine the Triangle, in such a Manner that we shall not be able to change them without changing one of the other Angles or known Sides. In all these Operations add the two Lines together, and subtract the first; unless you take arithmetical Compass of the first, and then add them together.



# Of Plain Trigonometry.

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## PROBLEM I.

*The Legs being given, to find the acute Angles*

|                                        |           |
|----------------------------------------|-----------|
| As the Leg AB 480                      | 2.681241  |
| Is to the Leg BC 360                   | 2.556302  |
| So is the Radius or Sine of $90^\circ$ | 10.000000 |
|                                        | <hr/>     |
| Sum                                    | 12.556302 |

To the Tangent of  $36^\circ 52'$  the Angle A 9.875061

## PROBLEM II.

*The Hypothenufe being given, and either of the said Legs, to find the acute Angles.*

|                                  |           |
|----------------------------------|-----------|
| As the Hypothenufe 600           | 2.778151  |
| To the Radius or Sine $90^\circ$ | 10.000000 |
| So is the Leg BC 360             | 2.556302  |
|                                  | <hr/>     |
| Sum                              | 12.556302 |

To the Sine of the Angle at A  $36^\circ 52'$  9.778151

*Note, When you have found one of the acute Angles, subtract it from  $60^\circ$ , and the Remainder will be the other acute Angle.*

## PROBLEM III.

*The Angles and either of the Legs being given, to find the other Leg.*

|                                                         |           |
|---------------------------------------------------------|-----------|
| As the Sine of $90^\circ$                               | 10.000000 |
| To the given Leg BC, 360                                | 2.556302  |
| So the Tangent of the acute Angle next the given Side C | 10.124939 |
|                                                         | <hr/>     |
| To the Leg sought, 480                                  | 2.681241  |

## PROBLEM IV.

*The Angles and the Hypothenufe being given, to find either of the Legs.*

|                                                     |           |
|-----------------------------------------------------|-----------|
| As the Sine of $90^\circ$ , the Radius              | 10.000000 |
| To the Hypothenufe                                  | 2.778151  |
| So is the Sine of the Angle opposite the Leg sought | 9.778851  |
|                                                     | <hr/>     |
| To the Leg sought, 360                              | 2.557002  |

C c 2

P R O-



## PROBLEM V.

*The Hypothenuſe and either of the Legs being given, to find the other Leg.*

Add the Logarithm of the Sum of the Hypothenuſe, and the given Leg to the Logarithm of their Difference, and the Half of the Sum of the Logarithms is the Logarithm of the Leg ſought, thus:

|                 |     |          |
|-----------------|-----|----------|
| The Hypothenuſe | 600 |          |
| The Leg BC      | 360 |          |
| Sum             | 960 | 2.982271 |
| Difference      | 240 | 2.380211 |
|                 |     | <hr/>    |
|                 |     | 5.362482 |
| The Side AB     | 480 | 2.681241 |
|                 |     | Sum      |
|                 |     | Half     |

Or if a Table of Logarithms is not at Hand, ſubſtract the Square of the Leg from the Square of the Hypothenuſe, and the Square Root of the Remainder is the Meaſure of the other Leg, thus:

The Square of 600 is 360000  
 of 360 is 129600

Remainder 930400

The Square Root of which is 480 as before.

*Note,* If the Sides of the Triangle are 60, 48, and 36 or any Numbers under 200, this Queſtion may be readily answered by the Table of ſquare Numbers inſerted in the Book. Thus,

*The Hypothenuſe and a Leg being given to find the other Leg.*

The Square of 60 is 3600  
 of 48 is 2304

Remainder 1296

Root 36

The Square of 60 is 3600  
 of 36 is 1296

Remainder 2304

Root 48

To find the Hypothenuſe,

$$\begin{array}{r} \text{The Square of } 48 \text{ } 2304 \\ \hline \text{of } 36 \text{ } 1296 \end{array}$$

$$\text{Sum } 3600$$

$$\text{Root } 600$$

These Rules will hold univerſally in all right-angled Triangles.

- P R O B L E M VI.

The Angles being given, and either of the Legs, to find the Hypothenuſe.

|                                                                     |                 |
|---------------------------------------------------------------------|-----------------|
| As the Radius or Sine of $90^\circ$                                 | 10.000000       |
| To the given Leg 360                                                | 2.556302        |
| So is the Secant of the Angle next the given }<br>Leg $53^\circ 8'$ | 10.221849       |
| To the Hypothenuſe 600                                              | <u>2.778151</u> |

Note, To find the Secant of an Angle, ſubſtract the ſine Complement of the ſaid Angle from 20.000000, the double Radius, and the Remainder will be the Secant ſought. Thus from

$$\begin{array}{r} 20.000000 \\ \text{Subſtract } 9.1778151 \text{ the Sine of } 36^\circ 52' \end{array}$$

The Remainder 10.221849 is the Secant of  $53^\circ 8'$  ſought.

Of Oblique-angled Plain Triangles.

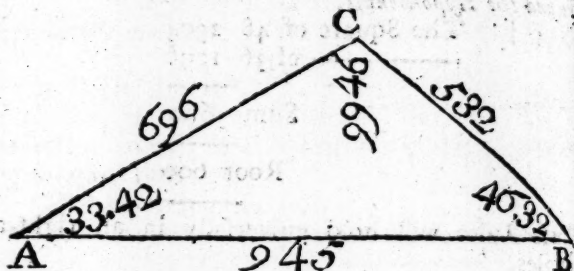
P R O B L E M I.

Two Sides and the Angle oppoſite to either of them being given, to find the oppoſite Angle.

It is neceſſary to know whether the Angle given be Obtufe or Acute. Thus the Angle at C may readily be perceived to be Obtufe, and conſequently the other two muſt be Acute. Likewise when an Obtufe Angle is given the Supplement to 180 muſt be taken.

C c 3

As



As the Side AC 696 Comp. Arith.

To the Sine of the Angle B  $46^{\circ} 32'$

So is the Side BC 532

7.157

9.860

2.725

To the Sine of the Angle A  $33^{\circ} 42'$

9.744

### PROBLEM II.

*Two Sides and the Angle included between them being given to find the other Angles.*

As the Sum of the two Sides AC and BC 1228

6.910

To the Difference of the same 164

2.214

So the Tangent of half the Sum of the Angles }  
sought  $40^{\circ} 7'$

9.925

To the Tangent of the Difference  $6^{\circ} 25'$

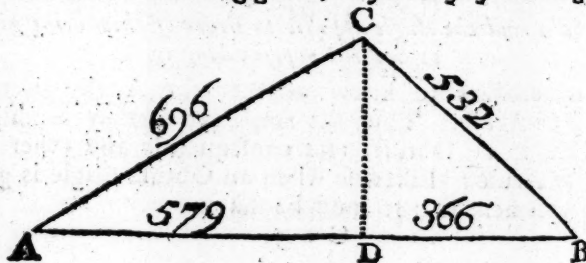
9.051

The Angle at C is  $99^{\circ} 46'$ , the Supplement of which 180 is  $80^{\circ} 14'$ , which is the Sum of the two remain Angles. The half of this Sum is  $40^{\circ} 7'$ , as above.

Now if you add this Difference  $6^{\circ} 25'$  to  $40^{\circ} 7'$  the Sum is  $46^{\circ} 32'$ , the greater Angle. And if you subtract from  $40^{\circ} 7'$  the Remainder is the lesser Angle  $33^{\circ} 42'$ .

### PROBLEM III.

*The three Sides being given, to find any of the Angles.*



# Of Plain Trigonometry.

295

Let the greatest Side AB be taken for the Base, and from the Angle C let fall a Perpendicular upon the Base; which will divide the given Triangle into two right-angled Triangles; and then say,

As the Base 945 Comp. Arith.

7.024568

Is to the Sum of the other Sides 1228

3.089198

So is the Difference 164

2.214844

To the Diff. of the Segments of the Base 213

2.328610

Subtract 213, the Difference found, from the Base 945, and the Remainder will be 732, the half of which is 366, which measures the Segment DB. The other half added to 213 makes 579 for the other Segment; so that you have two right-angled Triangles, of each of which a Leg and the Hypotenuse are known, which may be solved by the second Problem of the right-angled Triangles aforegoing.

Or you may add all the given Sides together, and from half the Sum subtract the Sides that the Angle sought lies between to gain their Difference. Then add the Complement Arithmetical of the Logarithms which comprehend the Angle, to the Logarithm of the Differences, and half the Sum will be the Logarithm of the Sine of half the Angle sought. Thus,

AB 945

AC 696

BC 532

Sum 2173

Half 1086½

Difference of AC 390

of BC 554

Logarithms.

696 Side AC 7.157391 Comp. Arith.

532 Side BC 7.274088 Comp. Arith.

Difference of AC 2.592177

Difference of BC 2.743509

Sum 19.767165

Half the Sum 9.883582 Sine of 49° 58'

49° 53. double is the Angle sought, 99° 46'

P R O-

## PROBLEM V.

*The Angles and one Side being given, to find the other Side*  
 As the Sine of the Angle opposite the given }  
 Side Comp. Arith. } 0.2550

To the given Side 532

So is the Sine of the Angle opposite the Side }  
 fought  $46^{\circ} 33'$  } 9.8719

To the Side fought 696

2.8429



## ASTRONOMICAL QUESTIONS.

I. **T**HE greatest Obliquity of the Ecliptic being given and the Distance of the Sun from the next Equinoctial Point to find his Declination. Suppose the Sun be in 0 Degree of Taurus, then he will be 30 Degrees from the Equinoctial Point, which is the Beginning of Aries and the greatest Declination or Obliquity of the Ecliptic to be 23 Degrees 29 Minutes. Then say,

As the Radius or Sine of 90 Degrees

10.0000

Is to the Sine of 30 Degrees

9.6980

So is the Sine of 23 Degrees 29 Min.

9.6000

To the Sine of present Declinat. 11 Deg. 30 Min. 9.2999

II. The greatest Declination being given, and the present Declination, to find the Sun's Place in the Ecliptic  
 As the Sine of the greatest Declin. Com. Arith. 0.3999

To the Sine of the present Declin.  $11^{\circ} 30'$

9.2999

So is the Radius

10.0000

To the Sun's Place in the Ecliptic, 30 Deg.

9.6980

III. The greatest Obliquity of the Ecliptic being given and the Distance of the Sun from the next Equinoctial Point, to find his right Ascension.



# Astronomical Questions.

297

the Radius                      10.000000  
 To the Sine Complement of the greatest }  
 Obliquity  $3^{\circ} 29'$  } 9.963243  
 is the Tangent of the Sun's Distance from }  
 Aries  $30^{\circ}$  } 9.761439

the Tangent of the right Ascension  $27^{\circ} 54'$  9.723892

IV. The greatest Obliquity of the Ecliptic and the  
 declination of the Sun being given, to find his right  
 ascension.

the Radius                      10.000000  
 To the Tangent of the Sun's Declin.  $11^{\circ} 31'$  9.301462  
 is the Tangent Com. of the greatest Obl. 10.362044

the Sine of the Sun's right Ascension  $27^{\circ} 54'$  9.670506

V. The greatest Obliquity of the Ecliptic, and the  
 distance of the Sun from the next Equinoctial Point, be-  
 ing given, to find the Angle the Ecliptic makes with the  
 Meridian

the Radius                      10.000000  
 To the Sine Comp. of the Sun's Distance }  
 from the next Equinoctial Point, } 9.937531  
 is the Tangent of the greatest Obliquity of }  
 the Ecliptic } 9.637956

the Tangent Complement of the Angle }  
 sought,  $69^{\circ} 23'$  } 9.575487

VI. The Sun's greatest Declination being given, and  
 present Declination, to find the Angle which the  
 Ecliptic makes with the Meridian.

the Sine Comp. of the Declination of the }  
 Sun  $11^{\circ} 30'$  Comp. Arith. } 0.008807  
 the Sine Comp. of the greatest Obliquity }  
 $23^{\circ} 29'$  } 9.962452

the Radius                      10.000000

the Line of the Angle sought  $69^{\circ} 23'$  9.971259

VII. The

VII. The Elevation of the Pole being, given, and Declination of the Sun, to find the Amplitude of the Sun ortive or occative.

As the Sine Comp. of the Elev. of the Pole } 0.205  
 $51^{\circ} 30'$  Comp. Arith. }  
 To the Sine of Declination of the Sun  $11^{\circ} 30'$  9.299  
 So is the Radius 10.000

To the Sine of the Amplitude sought  $18^{\circ} 40'$  9.505

Note, The Amplitude of the Sun ortive or occative that is, when he rises or sets, is towards the North when the Sun is in the six Northern Signs, Aries, Taurus, Gemini, Cancer, Leo, Virgo. Towards the South when is in the Southern Signs, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, and Pisces.

To find the Sun's greatest Amplitude proceed as before  
 As the Sine Complement of the Elevation of } 0.205  
 the Pole Comp. Arith. }

To the Sine of the Sun's greatest Declination 9.600  
 So is the Radius 10.000

To the Sine of the greatest Amplitude  $39^{\circ} 48'$  9.806

VIII. The Sun's greatest Amplitude, and his Distance from the next Equinoctial Point being given, to find the present Amplitude.

As the Radius 10.000  
 To the Sine of the Sun's greatest Amplitude } 9.806  
 $39^{\circ} 48'$  }  
 So is the Sine of the Sun's Distance from the } 9.698  
 Equinoctial  $30^{\circ}$  }

To the Sine of the Amplitude sought,  $18^{\circ} 40'$  9.505

IX. The Declination of the Sun and the Elevation of the Pole being given, to find the ascensional Difference.

As the Radius or Sine of  $90$  Degr. 10.000  
 To the Tangent of the Sun's Declin.  $11^{\circ} 30'$  9.308  
 So is the Tang. of the Elev. of the Pole  $51^{\circ} 30'$  10.099

To the Sine of the ascensional Difference  $14.49$  9.407

The ascensional Difference being converted into Time  
a Table made for that Purpose, and substracted from  
Hours when the Sun is in the Northern Signs, and  
led to six Hours when the Sun is in the Southern Signs,  
give the Time of his Rising. Thus  $14^{\circ} 40'$  turned  
Time make 59 Minutes, which substracted from 6  
Hours; leave 5 Hours 1 Minute, the Time of the Sun's  
Rising, and added to 6 give 6 Hours 59 Minutes, the  
Time of his Setting. Likewise the Time of the Setting  
being doubled will give the Length of the Day; thus twice  
Hours, 59 Minutes, make 13 Hours 68 Minutes, the  
Length of the Day.

X. The Declination of the Sun being given, and the  
Elevation of the Pole, to find the Time of the Sun's Rising  
and Setting.

|                                                      |       |           |
|------------------------------------------------------|-------|-----------|
| the Radius                                           | _____ | 10.000000 |
| To the Tangent of the Sun's Declin. $11^{\circ} 30'$ |       | 9.308463  |
| is the Tangent of the Elevation of the               | }     | 10.099395 |
| Pole $51^{\circ} 30'$                                |       |           |
| _____                                                |       |           |
| the Sine Complement of the feminoc-                  | }     | 9.407858  |
| tural Arch, $75^{\circ} 11'$                         |       |           |
| _____                                                |       |           |

is converted into Time, gives 5 Hours 1 Minute, the  
Time of the Sun's Rising, and substracted from 12 Hours,  
will be 6 Hours 59 Minutes, the Time of his Setting.

XI. The Elevation of the Pole, the Declination of the  
Sun, and the Hour of the Day being given, to find the  
Latitude or Height of the Sun.

|                                                                                                             |       |           |
|-------------------------------------------------------------------------------------------------------------|-------|-----------|
| the Radius                                                                                                  | _____ | 10.000000 |
| To the Tangent Complement of the Eleva-<br>tion of the Pole $51^{\circ} 30'$                                | }     | 9.900605  |
| the Sine Complement of the Distance of<br>the Sun from the Meridian 15 Degrees,<br>that is, 11 or 1 o'Clock |       |           |
|                                                                                                             | }     | 9.984944  |

|                                                |       |          |
|------------------------------------------------|-------|----------|
| the Tangent of the first Arch $37^{\circ} 32'$ | _____ | 9.885549 |
| _____                                          |       |          |

Subtract the Declination of the Sun from 90 Degrees, and  
you will have the Distance of the Sun from the Pole.  
Then from 6 in the Morning to 6 in the Evening sub-  
tract

subtract the first Arch from the Sun's Distance from the Pole and you will have the second Arch. Thus 90 Degrees.

Sun's Declination,  $41^{\circ} 30'$

Distance from the Pole,  $78^{\circ} 30'$

The first Arch,  $37^{\circ} 32'$

The second Arch,  $40^{\circ} 58'$

Then say,

As the Sine Complement of the first Arch }  $0.10072$   
found Comp. Arith.

To the Sine Complement of the second Arch  $9.87799$

So is the Sine of the Latitude  $51^{\circ} 30'$   $9.89354$

To the Sine of the Altitude of the Sun  $48^{\circ} 10'$   $9.87227$

This may be obtained more readily thus,

As the Cosine of the Hour from the Meridian }  $0.01505$   
 $15^{\circ}$  Comp. Arith.

To the Tangent of Latitude  $10.09939$

So is the Radius  $10.00000$

To the Tangent of the first Arch  $52^{\circ} 28'$   $10.11445$

When the Declination is North, subtract it from the first Arch found, and the Remainder shall be the second Arch. But when South, it must be added to make the second Arch.

First Arch  $52^{\circ} 28'$

Declination  $11^{\circ} 30'$

Second Arch  $40^{\circ} 58'$

As the Sine of the first Arch Co. Ar.  $52^{\circ} 28'$   $0.10072$

To the Cosine of the Second Arch  $40^{\circ} 58'$   $9.87799$

So is the Sine of the Latitude  $51^{\circ} 30'$   $9.89354$

To the Sine of the Altitude of the Sun  $48^{\circ} 10'$   $9.87226$

There is a more compendious and universal Way, which is less liable to Error; thus: Add the three Logarithms together, of the Sine Complement of the Height of the Pole

Pole, the Sine Complement of the Declination of the Sun, and the Sine Complement of the Distance of the Hour from the Meridian. Afterwards add together the Sine of the Height of the Pole, and the Sine of the Declination of the Sun, then neglecting the Radius's, subtract the least Sum from the greater; the Remainder will be a Logarithm to be sought for among those of the natural Numbers. But you must neglect the Characteristic, and look for it among the highest Numbers, in order to have Decimals. The following Example will make the Matter plain.

|                                               |          |
|-----------------------------------------------|----------|
| Sine Complement of the Height of the Pole     | 9.794149 |
| Sine Complement of the Declination of the Sun | 9.991193 |
| Sine Complement of the Hour 15°               | 9.984949 |

First Sum 0.770291

Least Sum 9.193199

Difference 0.577092

S. of the Pole's Height 9.903544

S. of the Sun's Decl. 9.299655

Least Sum 9.193199

Now as you see the Characteristic of the Remainder is the natural Number answering thereto must be under 4. Therefore I look for the Logarithm among the highest Numbers, and I find it to be 3.7765. That is 3, is the Integer, and the rest are decimal Fractions. Now as the Declination is North, I add 1 to the Integer; if South, I should have subtracted one from it; and then it will be thus, 4.7765. The Logarithm answering to this Number is 0.679101. To which I add the least Sum, which is the Sine of the Altitude sought.

0.679101

9.193199

9.872300

48.11

Suppose the Declination had been South, I should have taken one from the Integer 3.7765 and then it would have been, 2.7765 to which the corresponding Logarithm is D d 0.443498,



0.443498, which add to the least Sum, and it will make  
9.636627 the Sine of  $25^{\circ} 40'$ , when the Sun is in the Beginning of Scorpia.

XII. To find the Height of the Sun at the Hour of six  
As the Radius  $\frac{\text{---}}{\text{---}}$  10.0000

To the Sine of the Sun's Declination  $11^{\circ} 30'$  9.2996

So is the Sine of the Height of the Pole  $51^{\circ} 30'$  9.8935

To the Sine of the Sun's Height at six  $8^{\circ} 58'$  9.1931

XIII. To find the Height of the Sun when he is in the  
Equator.

As the Radius  $\frac{\text{---}}{\text{---}}$  10.0000

To the Cosine of the Height of the Pole  $51^{\circ} 30'$  9.7941

So is the Cosine of the Sun from Merid.  $15^{\circ}$  9.9849

To the Sine of the Altitude sought  $36^{\circ} 58'$  9.7790

XIV. The Latitude of the Place, and the Declination  
of the Sun being given, to find the Time when the Sun  
comes to be due East or West.

As the Tangent of the Latitude  $51^{\circ} 30'$  Co. Ar. 0.9006

Is to the Tangent of the Declination  $11^{\circ} 30'$  9.3084

So is the Radius  $\frac{\text{---}}{\text{---}}$  10.0000

To the Cosine of the Hour  $80^{\circ} 41'$  9.2090

This converted into Time is 5 Hours, 23 Minutes from  
Noon.

XV. the Latitude of the Place, and the Declination  
of the Sun being given, to find his Azimuth at six o'Clock

As the Radius  $\frac{\text{---}}{\text{---}}$  10.0000

To the Cosine of the Latitude  $51^{\circ} 30'$  9.7941

So is the Tangent of the Declination  $11^{\circ} 30'$  9.3084

To the Co. Tang. of the Azim. sought  $82^{\circ} 43'$  9.1020

**XVI. The Hour of the Day, the Sun's Altitude and his Declination being given, to find his Azimuth.**

As the Sine of the Sun's Altitude  $48^{\circ} 10'$  Co. Ar. 0.175896

Is to the Sine of  $15^{\circ}$  Deg. the Hour 9.412996

So is the Cosine of the Sun's Declination  $11^{\circ} 30'$  9.991193

To Sine of Sun's Azim. from the South  $22^{\circ} 21'$  9.580085

**XVII. The Azimuth, the Altitude, and the Declination of the Sun being given, to find the Hour of the Day.**

As the Cosine of  $11^{\circ} 30'$  the Declin. Co. Ar. 0.008807

To the Sine of the Azimuth  $22^{\circ} 21'$  9.580085

So is the Sine of  $48^{\circ} 10'$  the Altitude. 9.824104

To the Sine of the Hour  $15^{\circ}$  or 1 from Noon 9.412996

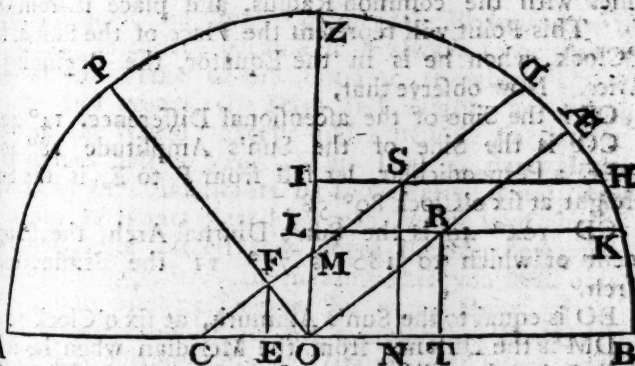
**XVIII. The Latitude of the Place, and the Sun's Declination being given, to find his Altitude when he is due East or West.**

As the Sine of the Latitude  $51^{\circ} 30'$  Co. Arith. 0.106456

To the Radius or Sine of  $90^{\circ}$  Deg. 10.000000

So is the Sine of the Declination  $11^{\circ} 30'$  9.299695

To Sine of Alt. when due East or West  $14^{\circ} 46'$  9.406151



To make these Matters more plain, take AO the Radius from 60 in a Line of Chords, or 90 in a Line of Sines  
D d 2 and

and describe the Semi-circle  $AZB$ . Then take  $38^{\circ} 30'$  the Height of the Equator or Complement of the Latitude of London, from the Line of Chords, and set it off from  $A$ , and draw the Line from  $A$  to  $O$  the Centre, and this will represent the half Equator above the Earth. But should have mentioned first, that the Semi-circle represents the Meridian of twelve o'Clock; that  $BZ$  is the South Part,  $AZ$  the North; that the Perpendicular raised from  $O$  to  $Z$  is the East, and that  $PO$  at right Angles with  $EO$  is half of the Axis of the World, and the Hour-Line of six o'Clock, that  $P$  is the North Pole, and  $Z$  the Zenith, or Point directly over our Heads. These Things being known, take  $11^{\circ} 30'$  the Declination of 0 Degree of Taurus, and place it from  $A$  to  $D$ . And the same from the Line of Sines of the same Radius, and set it off from  $O$  to  $E$  on the Line of six o'Clock. Draw a Line from  $D$  through  $F$  till it reaches  $C$  on the Diameter, which is the Point where the Sun sets in the Horizon  $AB$ . In this Line the Sun must necessarily be while he continues in  $0^{\circ}$  of Taurus. Now for Distinction Sake let the Hour be four o'Clock in the Afternoon, which is  $60^{\circ}$  from  $D$ , or  $30^{\circ}$  from  $PO$  the Hour of six, therefore take  $30^{\circ}$  from the Line of Sines and place it from  $E$  to  $S$ , which represents the Place of the Sun. Because  $DC$  is Part of a lesser Circle of the Sphere, I make  $ED$  the Radius, by means of a Sector, before I can measure  $30^{\circ}$  properly. I likewise take  $30^{\circ}$  from the Line of Sines with the common Radius, and place it from  $O$  to  $R$ . This Point will represent the Place of the Sun at four o'Clock, when he is in the Equator, the Beginning of Aries. Now observe that,

$CE$  is the Sine of the ascensional Difference,  $14^{\circ} 49'$ .

$CO$  is the Sine of the Sun's Amplitude  $18^{\circ} 40'$ .

$FE$  a Perpendicular, let fall from  $F$  to  $E$ , is the Sun's Height at six o'Clock  $80^{\circ} 58'$ .

$CD$   $104^{\circ} 49'$  is the Sun's Diurnal Arch, the Supplement of which to  $180$  is  $75^{\circ} 11'$  the Seminocturnal Arch.

$EO$  is equal to the Sun's Azimuth, at six o'Clock  $70^{\circ} 11'$ .

$DM$  is the Distance from the Meridian when he is due East  $80^{\circ} 41'$ , which turned into Time at  $15$  Degrees for an Hour, and a Degree for four Minutes, is  $5$  Hours, 4 Minutes.

SN is the Sine of the Sun's Altitude  $27^{\circ} 28'$   
 JS is the Sine of the Sun's Azimuth from the East  $17^{\circ} 3'$   
 IH being the Radius, and  $72^{\circ} 57'$  his Azimuth from  
 the South.  
 RT is the Sine of the Sun's Altitude at four o'Clock in  
 the Equator,  
 LR is the Sine of the Sun's Azimuth from the East,  
 when in the Equator as above,  $24^{\circ} 20'$ .

Note; This Scheme is drawn according to the orthographic  
 Projection of the Sphere, wherein all Circles perpendi-  
 cular to the Eye are projected into right Lines. Hence  
 all these Lines are measured by a Line of Sines, and the  
 outward Circle itself by a Line of Chords. Likewise  
 it is necessary to observe, that if you have occasion to  
 draw a Line from  $\text{AE}$  to  $\text{R}$ ,  $60^{\circ}$  in the Equator or any  
 other Circle projected into a Line, it will be best to take  
 $30$  Deg. the Complement, and set it off from  $\text{O}$  to  $\text{R}$ ,  
 because the Divisions of the Sines are much more distinct  
 above the Middle of the Circle.

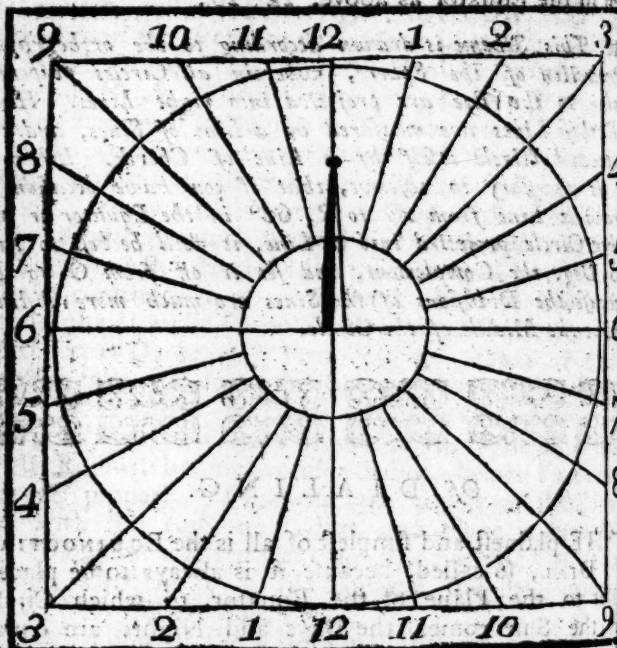


### OF DIALING.

THE plainest and simplest of all is the EQUINOCTIAL  
 DIAL, so called, because it is always to be placed  
 parallel to the Plane of the Equator, to which Circle  
 when the Sun comes, the Days and Nights are equal  
 throughout the World; except under the Poles where their  
 continuance half a Year. This Dial is particularly  
 calculated for the Inhabitants of those Parts, if any, be-  
 cause it has 24 Hours placed thereon, which is of singu-  
 lar Advantage, for those Places where the Sun never sets  
 six Months together. In making this you need only  
 divide a Circle into 15 Degrees for every Hour,  $7^{\circ} 30'$   
 half an Hour, and  $3^{\circ} 40'$  for a Quarter. The Gnomon  
 or Style is a straight Pin or Wire of any Length, plac-  
 ed in the Centre, and perpendicular to the Plane.  
 This Dial may be used in those Parts of the World, ly-  
 ing the Plane of the Dial parallel to the Plane of the  
 Equator.

Equator, and making the upright Gnomon to point exactly to the North Pole; but it is hardly worth while there being others more suitable to these Latitudes, and which may be placed with much less Trouble; especially as it is only fit for the Summer half Year.

*An EQUINOCTIAL DIAL.*



*To make an HORIZONTAL DIAL.*

An HORIZONTAL DIAL is that which is placed parallel to the Plane of the Horizon, and is to be fixed on a firm Post or Stone Pillar, where the Sun may shine on it at several Times of the Day, from his Rising to his Setting. Those that have Convenience to place this, need no other, because it serves all the Purposes of any other Dial that can be made.

There are different Ways of constructing this Dial, and a great deal of Pains has been taken, to no Man's Profit.



purpose, because the easiest and truest Way is By Arithmetical Calculation, and requires no other Instrument to use it but a Ruler on which a Line of Chords is placed.

TABLE of the Distances of the Hours, Half Hours, and Quarters, for all the Degrees of Latitude in England, Ireland, and Wales, in Horizontal Dials.

| Hours, Quarters | La. 50 | La. 51 | La. 52 | La. 53 | La. 54 | La. 55 | La. 56 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|
|                 | d. m.  | d. m.  | d. m.  | d. m.  | d. m.  | d. m.  | d. m.  |
| XII.            | 0 0    | 0 0    | 0 0    | 0 0    | 0 0    | 0 0    | 0 0    |
| 3               | 2 50   | 2 55   | 2 57   | 3 0    | 3 2    | 3 4    | 3 7    |
| 2               | 5 45   | 5 50   | 5 55   | 6 0    | 6 5    | 6 9    | 6 14   |
| 1               | 8 40   | 8 48   | 8 54   | 9 1    | 9 7    | 9 15   | 9 22   |
| XI              | 11 36  | 11 46  | 11 56  | 12 5   | 12 14  | 12 23  | 12 32  |
| 3               | 14 35  | 14 47  | 14 59  | 15 10  | 15 21  | 15 33  | 15 45  |
| 2               | 17 37  | 17 51  | 18 5   | 18 18  | 18 31  | 18 45  | 18 58  |
| 1               | 20 45  | 21 0   | 21 15  | 22 30  | 22 45  | 22 0   | 22 14  |
| X               | 23 52  | 24 10  | 24 28  | 24 45  | 25 2   | 25 19  | 25 35  |
| 3               | 27 6   | 27 26  | 27 46  | 28 5   | 28 24  | 28 42  | 28 59  |
| 2               | 30 27  | 30 48  | 31 10  | 31 30  | 31 50  | 32 9   | 32 28  |
| 1               | 33 54  | 34 17  | 34 39  | 35 0   | 35 21  | 35 42  | 36 1   |
| IX              | 37 27  | 37 51  | 38 14  | 38 36  | 38 58  | 39 19  | 39 40  |
| 3               | 41 8   | 41 33  | 41 56  | 42 19  | 42 42  | 43 3   | 43 23  |
| 2               | 44 57  | 45 22  | 45 46  | 46 9   | 46 30  | 46 52  | 47 13  |
| 1               | 48 54  | 49 19  | 49 42  | 50 5   | 50 27  | 50 48  | 51 8   |
| VIII            | 53 0   | 53 23  | 53 46  | 54 8   | 54 29  | 54 49  | 55 9   |
| 3               | 57 14  | 57 36  | 57 58  | 58 18  | 58 38  | 58 57  | 59 15  |
| 2               | 61 36  | 61 56  | 62 16  | 62 35  | 62 53  | 63 11  | 63 27  |
| 1               | 66 6   | 66 24  | 66 42  | 66 58  | 67 14  | 67 29  | 67 44  |
| VII             | 70 43  | 70 59  | 71 13  | 71 27  | 71 41  | 71 53  | 72 5   |
| 3               | 75 27  | 75 39  | 75 50  | 76 1   | 76 11  | 76 21  | 76 31  |
| 2               | 80 15  | 80 23  | 80 31  | 80 38  | 80 45  | 80 52  | 80 59  |
| 1               | 85 7   | 85 11  | 85 15  | 85 19  | 85 22  | 85 25  | 85 29  |
| VI              | 90 0   | 90 0   | 90 0   | 90 0   | 90 0   | 90 0   | 90 0   |

This Table is very plain and easy ; for suppose you were to make a Dial for the Latitude of 56°, then the Distance

Distance for the Hours 2 and 10 will be  $52^{\circ} 35'$ .  
 Distance for 2 and a Quarter will be  $28^{\circ} 59'$  and  
 Distance of 10 wanting a Quarter, or 3 Quarters after  
 is the same Distance; an Example of which will explain  
 this Matter fully. But I shall first shew how this Table  
 made. The Proportion is this:

|                                                      |       |         |
|------------------------------------------------------|-------|---------|
| As the Radius                                        | _____ | 10.0000 |
| To the Sine of $53^{\circ}$ the Latitude             | _____ | 9.902   |
| So is the Tangent of $60^{\circ}$ or four Hours      | _____ | 10.238  |
| To the Tan. of the Dist. from Merid. $54^{\circ} 8'$ | _____ | 10.146  |
| as in the Table                                      | _____ | _____   |

A TABLE shewing the LATITUDE of the principal Towns  
 Great-Britain and Ireland.

| NAMES of PLACES. |    | Lat. | NAMES of PLACES. |    |
|------------------|----|------|------------------|----|
| ENGLAND.         |    |      |                  | m. |
|                  | d. | m.   |                  |    |
| St. Alban's,     | 51 | 45   | Harwich,         | 52 |
| Arundel,         | 50 | 44   | Hereford,        | 52 |
| Berwick,         | 55 | 48   | Hereford,        | 51 |
| Bedford,         | 52 | 10   | Huntington,      | 52 |
| Bristol,         | 51 | 28   | Ipswich,         | 52 |
| Bury,            | 52 | 20   | London,          | 51 |
| Buckingham,      | 52 | 00   | Lancaster,       | 54 |
| Cambridge,       | 52 | 15   | Leicester,       | 52 |
| Canterbury,      | 51 | 19   | Lincoln,         | 53 |
| Carlisle,        | 54 | 45   | Litchfield,      | 52 |
| Chester,         | 53 | 12   | Northampton,     | 52 |
| Chichester,      | 50 | 50   | Newcastle,       | 54 |
| Colchester,      | 51 | 55   | Norwich,         | 52 |
| Coventry,        | 52 | 27   | Nottingham,      | 52 |
| Dover,           | 51 | 6    | Oxford,          | 51 |
| Derby,           | 52 | 57   | Plymouth,        | 50 |
| Dorchester,      | 50 | 40   | Portsmouth,      | 50 |
| Durham,          | 54 | 55   | Reading,         | 51 |
| Ely,             | 52 | 27   | Salisbury,       | 51 |
| Exeter,          | 50 | 54   | Shrewsbury,      | 52 |
| Falmouth,        | 50 | 15   | Stafford,        | 52 |
| Gloucester,      | 51 | 50   | Stamford,        | 52 |
| Guildford,       | 51 | 12   | Truro,           | 50 |
|                  |    |      | Warwick,         | 52 |

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|          |    |    |               |    |    |
|----------|----|----|---------------|----|----|
| chester, | 51 | 6  | Kincardine,   | 57 | 5  |
| rester,  | 52 | 15 | St. Andrew's, | 56 | 20 |
| ,        | 52 | 58 | Sterling,     | 56 | 12 |
|          |    |    | Wick,         | 58 | 40 |

## WALES.

|          |    |    |
|----------|----|----|
| knock,   | 52 | 18 |
| digan,   | 52 | 15 |
| marthen, | 51 | 50 |
| narvon,  | 53 | 20 |
| David's  | 51 | 57 |
| high,    | 53 | 15 |
| ,        | 53 | 17 |
| claff,   | 51 | 35 |
| mouth,   | 51 | 37 |
| broke,   | 51 | 46 |
| nor,     | 52 | 19 |

## IRELAND.

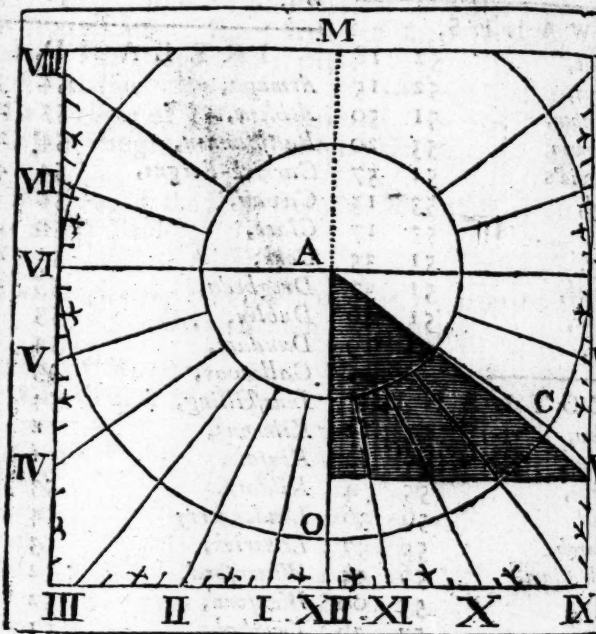
|                 |    |    |
|-----------------|----|----|
| Armagh,         | 54 | 30 |
| Athlone,        | 53 | 20 |
| Balishannon,    | 54 | 25 |
| Carrick-Fergus, | 54 | 45 |
| Cavan,          | 54 | 0  |
| Clare,          | 52 | 40 |
| Cork,           | 51 | 40 |
| Drogheda,       | 53 | 45 |
| Dublin,         | 53 | 16 |
| Dundalk,        | 54 | 5  |
| Galloway,       | 53 | 12 |
| Inneskilling,   | 54 | 20 |
| Kilkenny,       | 52 | 30 |
| Kinsale,        | 51 | 32 |
| Kildare,        | 53 | 10 |
| Londonderry     | 54 | 52 |
| Limerick,       | 53 | 35 |
| Waterford,      | 52 | 12 |
| Wexford,        | 52 | 15 |
| Youghal,        | 51 | 51 |

## COTLAND.

|          |    |    |
|----------|----|----|
| deen,    | 57 | 12 |
| blain,   | 56 | 13 |
| fries,   | 55 | 4  |
| keld,    | 56 | 36 |
| burgh,   | 55 | 57 |
| William, | 56 | 55 |
| gow,     | 55 | 00 |
| erneys,  | 57 | 36 |

HO

*A HORIZONTAL DIAL for the Latitude of fifty-two Degrees.*



In making this Dial draw two Squares, one within the other, leaving Space enough between them for the Figure of the Hours. Through the Middle of this draw a Line MO to represent the Meridian. Then cross it at right Angles, from six to six, and A shall be the Hour Line six. Take 60 Degrees in your Compasses from the Line of Chords, and sweep Part of a Circle, as you see in the Example. On which, from the same Line of Chords, take off the Hours, Halves and Quarters, from the foregoing Table, and for the Latitude of  $52^{\circ}$ . Then draw a Circle round A. This done, lay a Ruler to the Center A and through the Marks in the Circumference of the Circle draw the Hour Lines, and make Marks for Halves and Quarters. The Distance from six to seven is the same as from five to six; and the Distance from

five on the other Side, is the same as from seven to eight; likewise the Distance from seven to eight is the same from four to five; and the Distance from five to four on the other Side, is the same as from eight to seven. Then the Latitude of the Place lay  $52^{\circ}$  down from O to C, and the Angle OAC will be the Height of the Style.

*make a HORIZONTAL DIAL for the Inhabitants of the EQUATOR.*

The Ancients imagined the Torrid Zone was uninhabitable, on Account of excessive Heat; but Experience has shown the Contrary, for there are several Countries in Asia, Africa, and America, which lie directly under the Equator, and yet are full of People; it will be therefore necessary to know how to make a Dial for the Inhabitants of these Parts.

In this Case a Horizontal Dial is certainly the best, and may be made with a great deal of Ease; for if you reckon the Height of your Gnomon ten Parts, then the Tangents of natural Numbers are the Distances of the Hours. But because every Book of Logarithms has not the Tangents separate from the Logarithms of the Tangents, I shall give you the Hour Distances extracted from thence, which will also serve exactly for East and West Dials.



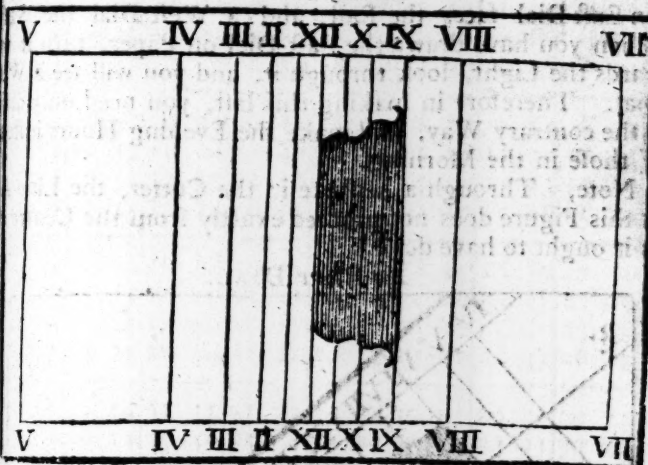
A TABLE of the Hour-Distances for Polar, East  
West Dials.

| For East and West Dials. |                        | For Polar Dials. |                     |
|--------------------------|------------------------|------------------|---------------------|
| Hours and Quarters.      | Hours in Deg. and Min. | Hour Distances.  | Hours and Quarters. |
| VI                       | 0                      | 0                | XII                 |
| 1                        | 3 3                    | 45 0             | 66 1                |
| 2                        | 2 7                    | 30 1             | 32 2                |
| 3                        | 1 11                   | 15 1             | 99 3                |
| VII                      | V 15                   | 0 2              | 68 1                |
| 1                        | 3 18                   | 45 3             | 39 1                |
| 2                        | 2 22                   | 30 4             | 14 2                |
| 3                        | 1 26                   | 15 4             | 93 3                |
| VIII                     | IV 30                  | 0 5              | 77 1                |
| 1                        | 3 33                   | 45 6             | 68 1                |
| 2                        | 2 37                   | 30 7             | 67 2                |
| 3                        | 1 41                   | 15 8             | 77 3                |
| IX                       | III 45                 | 0 10             | 00 1                |
| 1                        | 3 48                   | 45 11            | 41 1                |
| 2                        | 2 52                   | 30 13            | 32 2                |
| 3                        | 1 56                   | 15 14            | 96 3                |
| X                        | II 60                  | 0 17             | 33 1                |
| 1                        | 3 63                   | 45 20            | 27 1                |
| 2                        | 2 67                   | 30 24            | 14 2                |
| 3                        | 1 71                   | 15 29            | 46 3                |
| XI                       | I 75                   | 0 37             | 32 1                |
| 1                        | 3 78                   | 45 50            | 27 1                |
| 2                        | 2 82                   | 30 75            | 96 2                |
| 3                        | 1 86                   | 15 152           | 57 3                |

You may perceive by this Table that all the Hour  
tances, from twelve to three and nine in Polar Dials,  
from six to three and nine in East and West Dials, are  
than the Length of the Gnomon, and from thence to  
End they are much greater; for Instance, at five and  
and at eleven and one the Hour Distance is three Times  
the Length of the Gnomon, and seven tenths, besides  
Parts of a tenth; that is, 3 Lengths, 7 tenths, and a  
This may be readily measured with a Ruler that has a

nal Scale. This Horizontal Dial is called a Polar Dial, being parallel to the Axis of the World, and because the Plane of it is at right Angles to the Plane of the Equator. Besides what has been already said, it will be proper to observe, that these Hour Distances are exactly the same as the Line of Tangents upon a two Foot Ruler or Sector: reckoning  $15^{\circ}$  for one Hour,  $30^{\circ}$  for two, &c. as also  $90^{\circ}$  for the Height of the Gnomon. On some Rulers this Line is divided into Hours and Quarters, with the Word *Hour* at the Beginning. The Use of this Ruler will make the drawing of this Dial exceeding easy. After what has been said, I need only give you an Example in the following Figure.

A POLAR DIAL.



This is to be placed as a common Horizontal Dial, and the Gnomon, which you see is placed on the Hour-Line twelve, is equal in Height to the Distance between the Hour-Lines of twelve and nine. It must stand perpendicular to the Plane, and the Shadow of it will shew the Hours distinctly from seven in the Morning till five in the Afternoon. It may be made longer by the Help of the Line, but it will make the Dial unreasonably long.

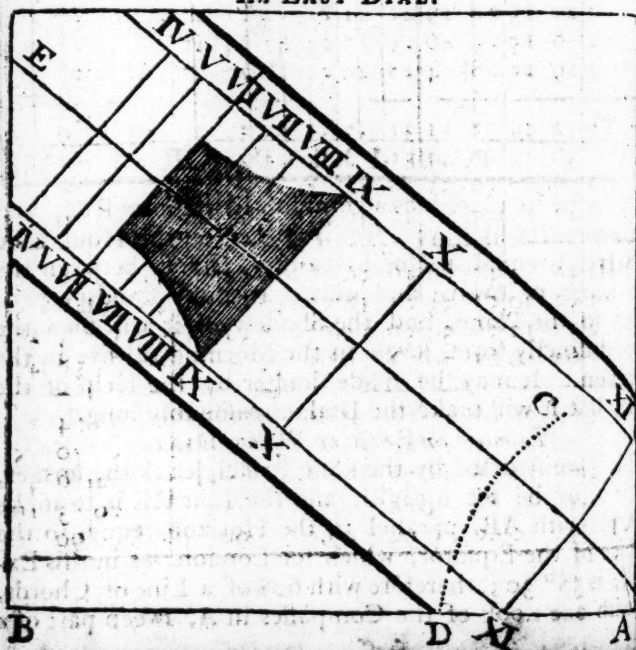
To make an EAST or WEST DIAL.

This is constructed by the same Principles as the former, only it is to be set upright, and the Line AE is to make an Angle with AB, parallel to the Horizon, equal to the Latitude of the Equator, which for London, as in this Example, is  $38^{\circ} 30'$ ; therefore with  $60^{\circ}$  of a Line of Chords, with one Foot of the Compasses in A, sweep part of a

Circle CD. Then take  $38^{\circ} 30'$  from your Line of Chords and set the Arch off from D towards C; make a Mark then draw the Line AE from the Centre A through the Mark, and this will represent the Equinoctial Line. Cut it at right Angles from six to six, as you see in the Scheme and that shall be the Place of the Style. Then set off many Hours as you see in the Example, each Way from the foregoing Table, drawing Lines parallel to VI V and so you will have all the Hours. The Difference between this and the Polar Dial is in the Position before-mentioned, in placing the Style on the Hour-Line of six, and in measuring the Hours from six instead of twelve. The Height of the Style is the Distance between six and nine in an East Dial, and between six and three in a West Dial. An East Dial faces the East, and a West Dial the West. When you have drawn the East Dial on Paper, turn it towards the Light, look through it, and you will see a West Dial. Therefore in making this last, you need only draw it the contrary Way, and make the Evening Hours instead of those in the Morning.

Note, Through a Mistake in the Cutter, the Line A in this Figure does not proceed exactly from the Centre as it ought to have done.

An EAST DIAL.



*Of Dialling.*

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## Of VERTICAL DIALS

These Dials are best made arithmetically, or by the  
 arches of the Hour Distances, which are found by the  
 same Analogy as in Horizontal Dials; only instead of the  
 Height of the Pole, the Complement to that Height must  
 be used, or which is the same Thing, the Height of the  
 Equator. However, I shall give the Hour-Distances ready  
 calculated, in the same Manner as the former.

TABLE of the Distances of the Hours, Half Hours, and Quarters for direct VERTICAL DIALS, agreeable to all the Degrees of Latitude in England, Wales, and Ireland.

[illegible]





A direct NORTH VERTICAL DIAL is nothing more than a Dial turned upside down, in which the Hours 9, 10, 11, 12, 1, 2, and 3, are useless, and consequently the drawing of them may be omitted when it is made for a North Plane.

OF DECLINING VERTICAL DIALS.

This is a Dial still remaining, which, if not the most useful, is generally most convenient, because it is to be placed on the Side of a Wall, which seldom or never faces the South directly, but declines sometimes towards the East, and sometimes towards the West. The chief Difficulty is to find how much it declines; this may be readily done if you observe when the Sun begins to glance on the Side of the Wall, at which Time the Hour and Minute is to be noted by a good Clock or Watch, and the Sun's Altitude is to be taken with a Quadrant at that Instant, from whence the Azimuth from the South may be obtained, which will shew the Declination, or it may be calculated as was before taught. If the Sun shines longest on the Wall in the Morning, it declines towards the East; if longest in the Afternoon, towards the West. So much as the Azimuth is more or less than 90 Degrees from the South, so much is the Declination of the Wall. How to gain the Azimuth from the Altitude of the Sun, and the Hour of the Day has been before taught.

But before we can draw this Dial there are several Things to be known, viz. 1. The Style's Distance from the Meridian, or Place of the Sub-style; 2. The Style's Height above the Sub-style; and 3. The Inclination of the Meridian, which some call the Longitude.

Suppose the Declination of a Wall, upon which a Dial is to be erected, was 45 Degrees; to find the Distance of the Sub-style, use the following Proportion:

|                                               |          |
|-----------------------------------------------|----------|
| As the Radius                                 | 10.00000 |
| Is to the Sine of the Wall's Declination, 45° | 9.84948  |
| So is the Co. Tangent of the Latitude 51° 30' | 9.90060  |

|                                               |         |
|-----------------------------------------------|---------|
| To the Tangent of Substyle's Distance 29° 21' | 9.75008 |
|-----------------------------------------------|---------|

E c 3

For

For the Height of the Style proceed thus :

|                                                           |         |
|-----------------------------------------------------------|---------|
| As the Radius                                             | 10.0000 |
| Is to the Co-Sine of the Wall's Declination, $45^{\circ}$ | 9.8490  |
| So is the Co-Sine of the Latitude $51^{\circ} 30'$        | 9.7940  |
| To the Sine of the Style's Height $26^{\circ} 7'$         | 9.6436  |

To find the Inclination of the Meridian, use the following Analogy.

|                                                                        |         |
|------------------------------------------------------------------------|---------|
| As the Radius                                                          | 10.0000 |
| Is to the Co-Tangent of the Wall's Declination $45^{\circ}$            | 10.0000 |
| So is the Sine of the Latitude $51^{\circ} 30'$                        | 9.8935  |
| To the Co-Tangent of the Inclination of the Meridian, $51^{\circ} 57'$ | 9.8935  |

Thus from the Elevation of the Pole  $51^{\circ} 30'$ , and the Declination of the Wall Eastward  $45^{\circ} 0'$ , we have the following Requisites.

The Height of the Style  $26^{\circ} 7'$   
 The Distance of the Sub-Style from the Meridian  $29^{\circ} 2'$   
 And the Inclination of the Meridian  $51^{\circ} 57'$

The following Table, which is calculated for the Latitude of London, will shew how the like Tables may be framed for any other Latitude.

# Of Dialling.

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three Requisites in Dialling, calculated to every Degree of the Declination of the Plane, in the Latitude of 51 Degrees 30 Minutes.

| Decl. | Sub Style's Distance Meridian. |    | Style's Height. |    | Inclinat. of Merid. |    | Decl. | Sub Style's Distance Meridian. |    | Style's Height. |    | Inclinat. of Merid. |    |
|-------|--------------------------------|----|-----------------|----|---------------------|----|-------|--------------------------------|----|-----------------|----|---------------------|----|
|       | d.                             | m. | d.              | m. | d.                  | m. |       | d.                             | m. | d.              | m. | d.                  | m. |
| 00    | 48                             | 38 | 29              | 1  | 17                  |    | 46    | 29                             | 46 | 25              | 37 | 52                  | 55 |
| 1     | 36                             | 38 | 28              | 1  | 33                  |    | 47    | 30                             | 11 | 25              | 07 | 54                  | 53 |
| 2     | 23                             | 38 | 26              | 3  | 49                  |    | 48    | 30                             | 35 | 24              | 38 | 55                  | 50 |
| 3     | 11                             | 38 | 23              | 5  | 07                  |    | 49    | 30                             | 58 | 24              | 06 | 55                  | 46 |
| 4     | 3                              | 38 | 20              | 6  | 23                  |    | 50    | 31                             | 21 | 23              | 35 | 56                  | 42 |
| 5     | 3                              | 58 | 38              | 15 | 7                   | 39 | 51    | 31                             | 45 | 23              | 04 | 57                  | 38 |
| 6     | 4                              | 45 | 38              | 10 | 8                   | 55 | 52    | 32                             | 05 | 22              | 32 | 58                  | 33 |
| 7     | 5                              | 32 | 38              | 04 | 10                  | 11 | 53    | 32                             | 20 | 22              | 00 | 59                  | 28 |
| 8     | 6                              | 19 | 38              | 04 | 11                  | 27 | 54    | 32                             | 46 | 21              | 28 | 60                  | 23 |
| 9     | 7                              | 05 | 37              | 57 | 11                  | 42 | 55    | 33                             | 06 | 20              | 55 | 61                  | 17 |
| 10    | 7                              | 52 | 37              | 49 | 12                  | 57 | 56    | 33                             | 24 | 20              | 22 | 62                  | 10 |
| 11    | 8                              | 38 | 37              | 40 | 13                  | 11 | 57    | 33                             | 42 | 19              | 49 | 63                  | 04 |
| 12    | 9                              | 23 | 37              | 30 | 15                  | 26 | 58    | 34                             | 00 | 19              | 16 | 63                  | 57 |
| 13    | 10                             | 08 | 37              | 21 | 16                  | 40 | 59    | 34                             | 17 | 18              | 42 | 64                  | 49 |
| 14    | 10                             | 54 | 37              | 10 | 17                  | 54 | 60    | 34                             | 33 | 18              | 08 | 65                  | 41 |
| 15    | 11                             | 38 | 36              | 58 | 18                  | 07 | 61    | 34                             | 50 | 17              | 34 | 66                  | 33 |
| 16    | 12                             | 22 | 36              | 43 | 20                  | 20 | 62    | 35                             | 05 | 17              | 00 | 67                  | 24 |
| 17    | 13                             | 05 | 36              | 32 | 21                  | 33 | 63    | 35                             | 18 | 16              | 25 | 68                  | 16 |
| 18    | 13                             | 49 | 36              | 18 | 22                  | 45 | 64    | 35                             | 34 | 15              | 50 | 69                  | 07 |
| 19    | 14                             | 31 | 36              | 03 | 23                  | 57 | 65    | 35                             | 47 | 15              | 13 | 69                  | 57 |
| 20    | 15                             | 13 | 35              | 48 | 24                  | 08 | 66    | 36                             | 00 | 14              | 40 | 70                  | 47 |
| 21    | 15                             | 54 | 35              | 31 | 26                  | 18 | 67    | 36                             | 13 | 14              | 05 | 71                  | 38 |
| 22    | 16                             | 36 | 35              | 16 | 27                  | 29 | 68    | 36                             | 25 | 13              | 29 | 72                  | 27 |
| 23    | 17                             | 16 | 34              | 57 | 28                  | 38 | 69    | 36                             | 36 | 12              | 53 | 73                  | 16 |
| 24    | 17                             | 56 | 34              | 39 | 29                  | 47 | 70    | 36                             | 46 | 12              | 18 | 74                  | 06 |
| 25    | 18                             | 35 | 34              | 21 | 30                  | 56 | 71    | 36                             | 55 | 11              | 41 | 74                  | 55 |
| 26    | 19                             | 13 | 34              | 01 | 31                  | 04 | 72    | 37                             | 06 | 11              | 06 | 75                  | 44 |
| 27    | 19                             | 50 | 33              | 42 | 33                  | 12 | 73    | 37                             | 15 | 10              | 29 | 76                  | 33 |
| 28    | 20                             | 29 | 33              | 21 | 34                  | 19 | 74    | 37                             | 24 | 09              | 53 | 77                  | 21 |
| 29    | 21                             | 05 | 32              | 59 | 35                  | 25 | 75    | 37                             | 32 | 09              | 16 | 78                  | 09 |
| 30    | 21                             | 40 | 32              | 37 | 36                  | 31 | 76    | 37                             | 40 | 08              | 40 | 78                  | 57 |
| 31    | 22                             | 15 | 32              | 15 | 37                  | 36 | 77    | 37                             | 47 | 08              | 03 | 79                  | 46 |
| 32    | 22                             | 50 | 31              | 52 | 38                  | 41 | 78    | 37                             | 53 | 07              | 27 | 80                  | 33 |
| 33    | 23                             | 25 | 31              | 27 | 39                  | 46 | 79    | 37                             | 59 | 06              | 49 | 81                  | 21 |
| 34    | 23                             | 59 | 31              | 04 | 40                  | 49 | 80    | 38                             | 04 | 06              | 12 | 82                  | 09 |
| 35    | 24                             | 31 | 30              | 40 | 41                  | 52 | 81    | 38                             | 09 | 05              | 35 | 82                  | 56 |
| 36    | 25                             | 04 | 30              | 14 | 42                  | 55 | 82    | 38                             | 14 | 04              | 55 | 83                  | 43 |
| 37    | 25                             | 35 | 29              | 48 | 43                  | 58 | 83    | 38                             | 17 | 04              | 20 | 84                  | 31 |
| 38    | 26                             | 04 | 29              | 22 | 44                  | 59 | 84    | 38                             | 21 | 03              | 44 | 85                  | 18 |
| 39    | 26                             | 35 | 28              | 56 | 45                  | 00 | 85    | 38                             | 23 | 03              | 06 | 86                  | 05 |
| 40    | 27                             | 03 | 28              | 29 | 47                  | 00 | 86    | 38                             | 26 | 02              | 28 | 86                  | 52 |
| 41    | 27                             | 33 | 28              | 01 | 48                  | 00 | 87    | 38                             | 28 | 01              | 52 | 87                  | 39 |
| 42    | 28                             | 01 | 27              | 33 | 49                  | 00 | 88    | 38                             | 29 | 01              | 15 | 88                  | 26 |
| 43    | 28                             | 29 | 27              | 05 | 50                  | 59 | 89    | 38                             | 29 | 00              | 37 | 89                  | 13 |
| 44    | 28                             | 55 | 26              | 36 | 50                  | 57 | 90    | 38                             | 30 | 00              | 00 | 90                  | 00 |
| 45    | 29                             | 21 | 26              | 07 | 51                  |    |       |                                |    |                 |    |                     |    |

We must observe that the Inclination of the Meridian being  $51^{\circ} 57'$ , which is more than  $45^{\circ}$ , or three Hours the Distance of Nine o'Clock from the Meridian, you must subtract  $45^{\circ}$  from  $51^{\circ} 57'$ , and there will be  $6^{\circ} 57'$ , the Distance of Nine o'Clock from the Sub-Style. Likewise because Eight o'Clock is  $60^{\circ}$  distant from the Meridian subtract  $51^{\circ} 57'$  from it, and there will remain  $8^{\circ} 3'$ , the Distance of Eight o'Clock from the Sub-Style. All the rest of Hours, and Parts of Hours, are easily found adding fifteen Degrees for an Hour;  $7^{\circ} 30'$  for half Hour, and  $3^{\circ} 45'$  for a Quarter, as will plainly appear by the following Table. The next Thing to be done is to find the Hour Distances, which is performed by the following Proportion.

|                                                                       |        |
|-----------------------------------------------------------------------|--------|
| As the Radius                                                         | 10.000 |
| To the Tangent of $6^{\circ} 57'$ , the Equinoctial Distance          | 9.085  |
| So is the Sine of $26^{\circ} 7'$ , the Pole's Height above the Plane | 9.643  |
| To the Tangent of $3^{\circ} 4'$ , the Hour Distance for 9 o'Clock    | 8.729  |

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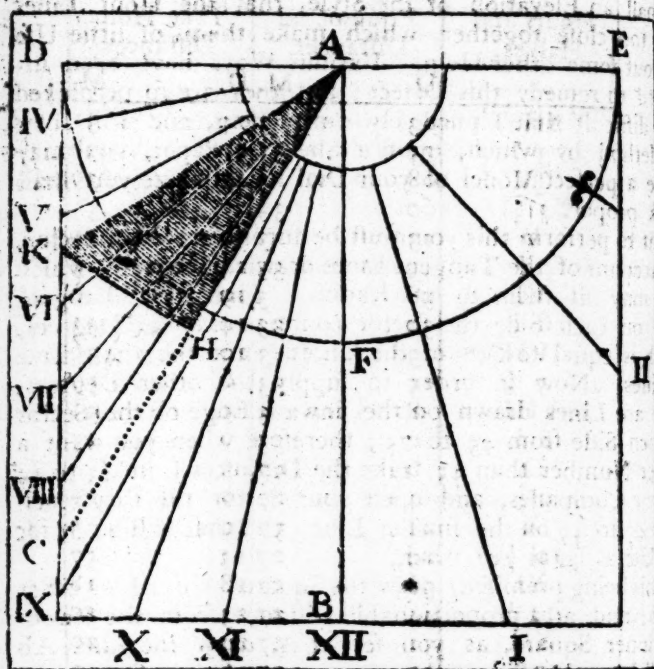
TABLE of the Equinoctial Distances of the Hours from the Sub-style, and also of the true Hour-Distances.

| Hours and Halves. | Equinoctial Distances. |      | True Hour Distances |    |
|-------------------|------------------------|------|---------------------|----|
|                   | D.                     | M.   | D.                  | M. |
| III.              | 83                     | 374  | 31                  |    |
| 3 $\frac{1}{2}$   | 75                     | 3357 | 38                  |    |
| IV                | 68                     | 347  | 39                  |    |
| 4 $\frac{1}{2}$   | 60                     | 3337 | 55                  |    |
| V                 | 53                     | 330  | 19                  |    |
| 5 $\frac{1}{2}$   | 45                     | 3324 | 9                   |    |
| VI                | 38                     | 319  | 0                   |    |
| 6 $\frac{1}{2}$   | 30                     | 3314 | 33                  |    |
| VII               | 23                     | 310  | 36                  |    |
| 7 $\frac{1}{2}$   | 15                     | 336  | 59                  |    |
| VIII              | 8                      | 33   | 3                   |    |
| 8 $\frac{1}{2}$   | 0                      | 330  | 15                  |    |
| IX                | 6                      | 573  | 4                   |    |
| 9 $\frac{1}{2}$   | 14                     | 276  | 28                  |    |
| X                 | 21                     | 5710 | 3                   |    |
| 10 $\frac{1}{2}$  | 29                     | 2713 | 57                  |    |
| XI                | 36                     | 5718 | 18                  |    |
| 11 $\frac{1}{2}$  | 44                     | 2723 | 20                  |    |
| XII               | 51                     | 5729 | 20                  |    |
| 12 $\frac{1}{2}$  | 59                     | 2736 | 42                  |    |
| I                 | 66                     | 5745 | 57                  |    |
| 1 $\frac{1}{2}$   | 74                     | 2757 | 41                  |    |
| II                | 81                     | 5772 | 11                  |    |
| 2 $\frac{1}{2}$   | 89                     | 2788 | 46                  |    |

In drawing this Dial, after you have let fall the Perpendicular Line from A to B, which represents the Meridian, set it at right Angles with the Line DE; then from the Centre A, describe the Semicircle FD, and set off  $29^{\circ} 21'$  from F to H; at H make a Mark, and from the Centre A, through the Mark H, draw the Line AC for the Line of the Sub-style; from I, the Mark of the Sub-style, towards K, set off  $26^{\circ} 7'$ , the Height of the Style, and draw the Line AK. This done, mark off all the Hours and half Hours on the Semi-Circumference from the Sub-style, and draw Lines for the Hours, as you see in the sample.



**A VERTICAL DIAL declining Eastward from the South.**



When the Dial is thus drawn, you have four Dials made by this single Example for the same Declination 45° because if you turn it upside down; it will become a North-East declining Dial; on the Draught, and the back Sheet will shew a Westward declining Dial, only changing the Hours of the Morning to those of the Evening. Then turn it upside down, and you have a North-West Decline

## Of VERTICAL DIALS without a Centre.

Dials that decline  $80^{\circ}$  or upwards, East or West, have small an Elevation of the Style, that the Hour Lines are too close together, which make them of little Use without some other Help. Various Ways have been invented to remedy this Defect; but they are so perplexed and difficult that I purposely omit them, and will shew Method by which, upon a Sheet of Paper, you may make a perfect Model of your Dial for any Size you shall think proper.

But to perform this you must be furnished with a Sector, and Account of the Tangent Lines drawn upon it, by which you may fit them to any Radius. The great Tangent Line on each Side the Sector contains only  $45^{\circ}$  Degrees, which is equal to  $60^{\circ}$  of the Chords, and the whole Line of Sines. Now in order to supply the other Degrees, there are Lines drawn on the inward Edge of the Sector on each Side from  $45$  to  $75$ ; therefore when you want a Number than  $45$ , take the Distances from  $45$  to  $45$  in your Compasses, and open your Sector till they reach from  $45$  to  $45$  on the smaller Line, and that will be fit for Use as far as  $75^{\circ}$  reach.

This being premised, draw the Squares as usual for other Dials; and at a proportionable Distance from the Side of the inner Square, as you see at A, draw the Line AB parallel to the Sides, then open your Compasses to the Radius of a Line of Sines, or  $60^{\circ}$  of the Chords, or  $45^{\circ}$  of the Tangent, setting one Foot in A to describe the Figure Arch BE. Suppose then the Declination of the Dial to be  $83^{\circ} 37$  Minutes in the Latitude of London, you may find out by Calculation, as in the proceeding Section, by the Table, that the Height of the Style is  $3^{\circ} 53'$ , the Distance of the Sub style from the Meridian  $38^{\circ} 18'$ , the Inclination of the Meridian  $15^{\circ}$ ; therefore take  $18$  in your Compasses from your Line of Chords, and set it from B to C; likewise  $3^{\circ} 58'$ , and set it from C to make Marks at each, and from the Centre A draw obscure Lines AC and AD: This done, allow a proper Height for your Style, as from C to E, and draw the Line EF parallel to DA. This done, take the Height of the Style in your Compasses on the Line HK, drawn

at

at right Angles to the Substyle, and open the Sector to the Distance from 45 to 45 on the great Line of the Tangents.

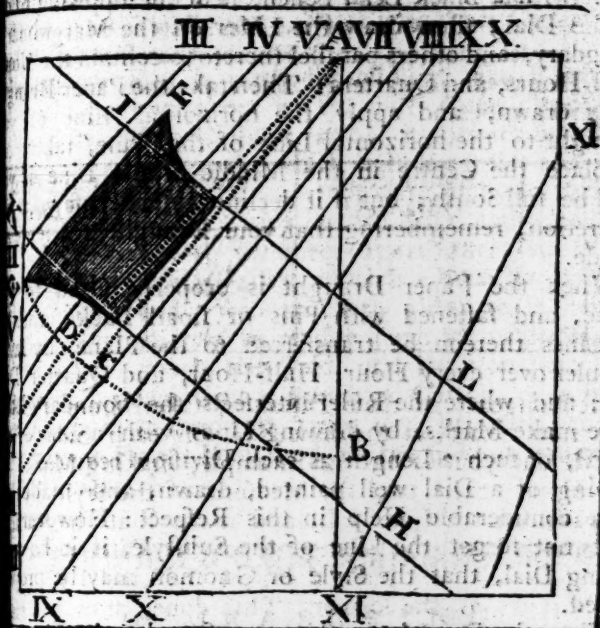
But before you proceed any farther, it will be proper to make a Table of the Hour Distances in the following Manner: As the Inclination of the Meridian is  $85^{\circ}$ , which is 5 Degrees less than  $90^{\circ}$  or six Hours, therefore six o'Clock is five Degrees beyond the Substyle, as from the following Table will appear.

| Hours. | Equinoctial Distances. | Hours. | Equinoctial Distances. |
|--------|------------------------|--------|------------------------|
| IV     | $35^{\circ}$ 0         | VIII   | $25^{\circ}$ 0         |
| V      | 20 0                   | IX     | 40 0                   |
| VI     | 5 0                    | X      | 55 0                   |
| VII    | 10 0                   | XI     | 70 0                   |

The Tangents of these Distances taken from the Sector are to be set on the Line KH, on each Side of Substyle, as you see in the Example, making Marks every Hour; then take the Measure of the Style in your Compasses on the Line I L, and make that the Radius after which take the Tangents of the Distances of Hour as before, and place them on the Line I L, in the same Manner as the former: This done, draw the Hour Lines through the Marks, and the Dial is finished.

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VERTICAL DIAL declining EAST above 80 Degrees.



Of the Colouring SUN DIALS.

THE best Colours for painting Sun Dials are, Spanish Brown for the Priming or first Colour, White Lead for the second Colour, and Lamp-black for drawing the Lines and Figures. Dip a large Bristle-Brush in the Brown, well ground with Linseed Oil, and colour the Board or Plane all over, on the Back as well as the Face, leaving no Part uncoloured: This is called the Priming of the Dial. When this first Colour is dry, do it again with the same tempered somewhat thicker: When this is also dry, it will not be amiss to cover it over with the same Colour, because by this Means the Colour will be more substantial, and last the longer, till this last Time of colouring is dry, then use White Lead with which colour the Face of the Plane all over.

F f

When

When it is dry it may be repeated three or four Times and the Face will be fit to withstand the Violence of Weather. This done, draw a horizontal Line on y<sup>e</sup> Plane with a Black Lead Pencil, near the uppermost Boundary of the Dial; then draw the Lines on the Margin for Half-Hours, and Quarters: Then take the Paper Draught fairly drawn, and apply the horizontal Line of y<sup>e</sup> Draught to the horizontal Line of the Plane, taking care to place the Centre in the Middle of the Line if y<sup>e</sup> Dial be full South; but if it declines much, use your Discretion, remembering that your Draught will serve as a Guide.

When the Paper Draught is properly fitted to y<sup>e</sup> Plane, and fastened with Pins or small Tacks, then the Lines thereon be transferred to the Plane, by laying a Ruler over every Hour, Half-Hour, and Quarter Division; and where the Ruler intersects the boundary Lines there make Marks, by drawing Lines with a Black Pencil, of such a Length as each Division requires. The viewing of a Dial well painted, drawn, and made, will be a considerable Help in this Respect: However, you must not forget the Line of the Substyle, if it be a declining Dial, that the Style or Gnomon may be properly placed.

When the Draught is thus transferred to the Plane, colour the boundary Lines with good Lamp-Black, or Black Paint; as also the Hour, Half-Hour, and Quarter Divisions must be drawn with the same. Let the Colour be as thick and as stiff as you can possibly use it, so as to draw a clear and smooth Line; then draw the Figures of the same Colours; and last of all take care to place the Gnomon of a proper Height, perpendicular to the Plane, and the Dial will be finished. Some indeed put the Date of the Year, and some remarkable Sentence on the Dial, but that must be left to your own Discretion.

Some, who are fond of Show, are for having the Figures gilt, and then you may take Gold Size to draw with, which may be made with drying Oil, and yellow Oker, ground as fine as the Oil itself, to lay your Gold on. You will know when it is sufficiently dry to gild on, by touching it with the End of your Finger; and



# Of Dialling.

327

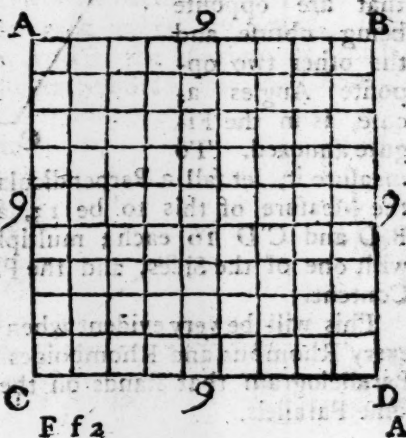
ur Finger sticks a little thereto, without bringing the  
our off it is dry enough ; but if the Colour comes off,  
must let it alone a little longer, otherwise it will drown  
ur Gold. If it be too dry, there is no other Remedy but  
sizing.

When your Size is ready for gilding, take a Book of  
of Gold, and take out a Leaf with Cane Plyers, and  
it on the gilding Cushion, and if it does not lie smooth  
it with your Breath, which will lay it flat and even ;  
with a Knife of Cane, or for want of it, an ordinary  
eker Knife that has a very smooth Edge and wiped very  
y, cut the Gold into such Pieces as are fit for your Work ;  
with your gilding Pallet, which is a little Bit of Wood,  
per-shaped, and a woollen Cloth glued to it, take up  
r Gold, which may be readily done if you breathe up-  
the Cloth, touch the Gold, and lay it on your Size ;  
a press it down with a Bunch of Cotton, or a Hare's  
ot. When all Parts are quite dry, brush off the loose  
ld with a Hare's Foot, and so the Gilding will remain  
rand beautiful.

## Of MEASURING.

### Of MEASURING SUPERFICIES.

Square is a Figure A  
with four equal  
s, and as many right  
gles. It is measured  
multiplying the Side  
o itself, and the Pro-  
is the Content. Let  
B, C, D, be a true  
are, each Side being  
e Feet, Yards, Poles,  
other Measure ; mul-  
y nine by itself, and  
Product is 81.

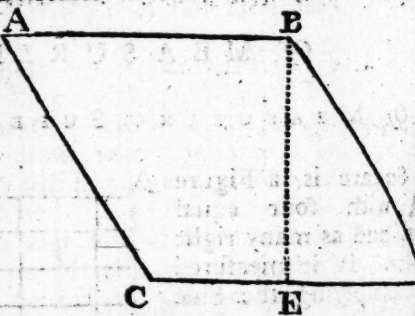


A PARALLELOGRAM, A, or long Square, has four Sides, and as many right Angles, the opposite Sides of which are equal and parallel: Multiply the Length by the Breadth, and the Product will give the Content. Thus in the adjacent Figure A, B, C, D, multiply 8, the Length, by 6, the Breadth, and the Product is the Content.



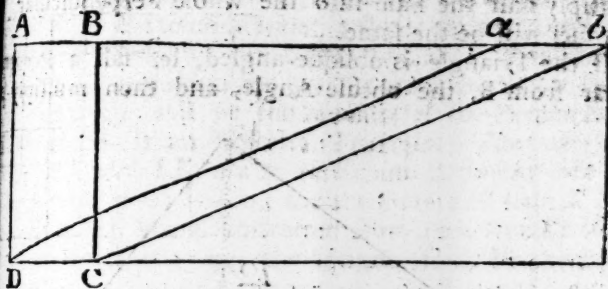
Here it may be observed, that if two Superficies have the same Circumference, unless the Figures are the same the Content will be by no Means equal. Thus in the Square just mentioned, the Sum of all the Sides is 32. Likewise a Parallelogram, that has two Sides equal to 6 each, and the other two equal to twelve each, will have 36 for the Circumference and 72 for the Content, as appears by multiplying one Number into the other. Where the Content of the Square is 64; which makes a considerable Difference. Many a Person has been cheated for want of understanding this Rule.

A RHOMBUS A is a Figure having four equal Sides with unequal Angles, two of which that are opposite being obtuse and the other two opposite Angles acute, as in the Figure annexed. To

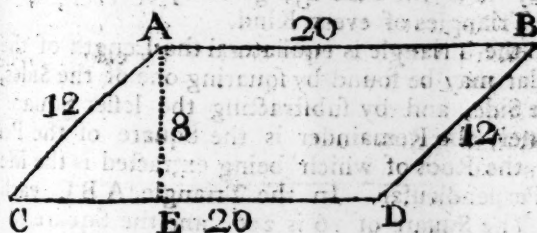


measure it, let fall a Perpendicular from B to E. Suppose the Measure of this to be 13, and the Sides A B, A D and C D 16 each; multiply the Perpendicular with one of the Sides, and the Product 208, will be the Content.

This will be very evident when we shall understand that every Rhombus and Rhomboides is equal to a Square or Parallelogram that stands on the same Base between the same Parallels.

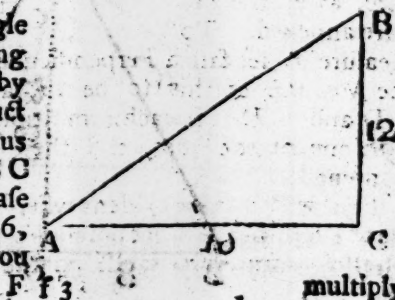


Thus the Parallelogram A, B, C, D, has the same Dimensions as  $ab$  CD, and therefore the Perpendicular A D, multiplied into the Base, must needs give the Content of the same. The same will hold good in Triangles of all Kinds. A RHOMBOIDES is a Figure having four Sides, two of



which are longer than the other two, but the opposite sides are equal. It has likewise two acute Angles, and two obtuse: Those opposite to each other are equal. Let a Perpendicular from A to E, the Measure of which is 8; multiply 8 by 20, the longest Side, and the Content will be 160.

A right-angled Triangle measured by multiplying the Perpendicular by the Base, and the Product will be the Content. Thus if the Perpendicular B C be multiplied into the Base A C, the Product is 96, the Content. Or if you

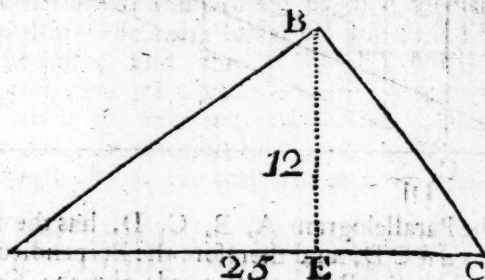


F 13

multiply

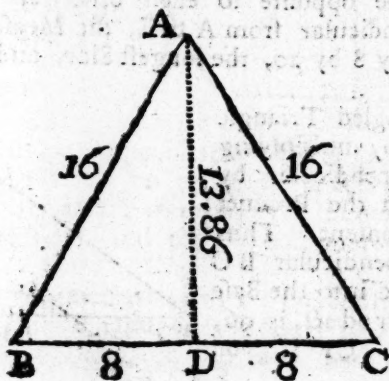
multiply half the Base into the whole Perpendicular, Product will be the same.

If the Triangle is oblique-angled, let fall a Perpendicular from B, the obtuse Angle, and then multiply



of it by the Base as before, and the Product will be the Contents. Thus half the Perpendicular BE 6, multiplied by AC the Base 25, gives 150. This Rule holds good in Triangles of every Kind.

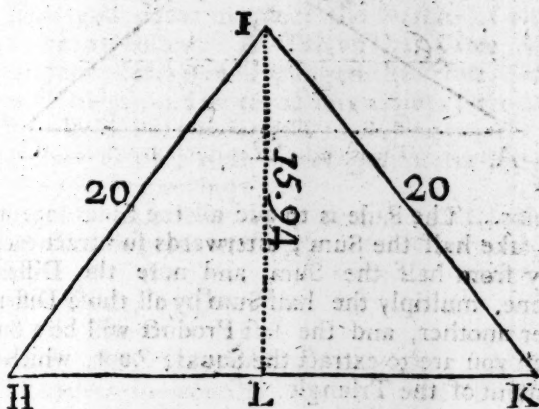
When the Triangle is equilateral the Length of the perpendicular may be found by squaring one of the Sides, half the Side, and by subtracting the lesser Square from the greater, the Remainder is the Square of the Perpendicular, the Root of which being extracted is the Measure of the Perpendicular. In the Triangle ABC each Side is 16. The Square of 16 is 256, and the Square of 8 half of it, is 64, which subtracted from 256, leaves the Square Root of which 13.86 equal to the Perpendicular AD.



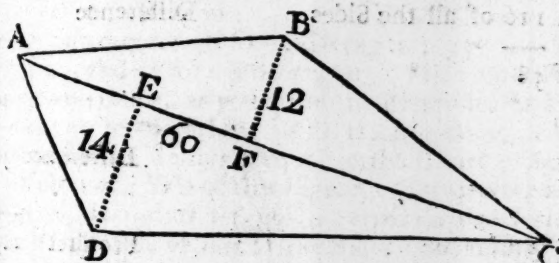
## Of Measuring.

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The Perpendicular of an Iſoſceles Triangle may be meaſured in the ſame Manner only by ſquaring one of the equal Sides and half the other, and then by ſubſtracting the leſſer Square from the greater, and the ſquare Root of the Remainder will be the Meaſure of the Perpendicular. Thus  $H I K$  is an Iſoſceles Triangle. The two equal Sides  $H I$  and  $I K$  are 20 each, and the other Side is 24. The Square of 20 is 400, and the Square of half  $K H$  12 is 144, which being ſubſtracted from 400, leaves 256, the Root of which is 15.94, the Height of the Perpendicular.



A TRAPEZIUM is an irregular Figure, having four unequal Sides and four unequal Angles, as in the Figure  $B C D$ . To meaſure it you muſt draw the diagonal

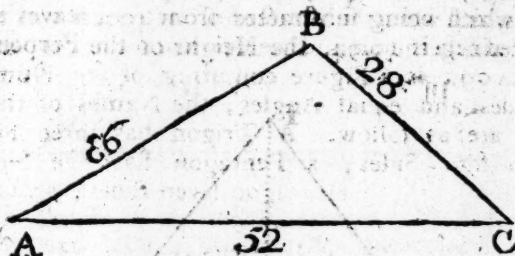


from  $A$  to  $C$ , which will reduce it into two Triangles  $A B C$  and  $A D C$ . Let fall the Perpendiculars  $B F$



B F and E D; then measure the Length of these, as for Instance, A C is 60, B F 12, and E D 14; add the two Perpendiculars together, and they make 26, the half of which is 13; multiply the Diagonal 60 by 13, and the Product will be 780, the Content of the Trapezium.

There is another Way of measuring a Triangle, which is sometimes more convenient than by letting fall a Perpendicular.



The Rule is to add all the Sides together and then to take half the Sum; afterwards subtract each Side severally from half the Sum, and note the Differences. This done, multiply the half Sum by all those Differences one after another, and the last Product will be a Sum of which you are to extract the Square Root, which will be the Content of the Triangle.

The Sides

|     |    |    |             |
|-----|----|----|-------------|
| A C | 52 | 6  | Differences |
| A B | 36 | 22 |             |
| B C | 28 | 30 |             |

Sum 116 of all the Sides

Half 58

Half Sum  
Difference

Product  
Difference

Difference 382

Product 2296

The Logarithm of this Number  
Half is the Logarithm of the Root

5.3611  
2.6805

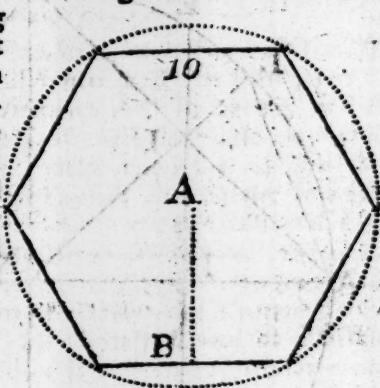
The Number answering to half the Logarithm is 797<sup>25</sup>. Now as the Index is 2, the whole Number can be but three Figures, that is 479; the rest are Decimal Fractions. The best Tables of Logarithms for this Purpose are Sherwin's and Gardiner's. If these are wanting the Root may be extracted the common Way, as has been before taught.

All irregular Figures, if possible, are to be reduced to Triangles, and when the Content of each is known, they are to be added together to find the Content of the whole Figure.

A POLYGON is a Figure consisting of any Number of equal Sides and equal Angles; the Names of the most common are as follow. A Trigon has three Sides; a Tetragon four Sides; a Pentagon has five Sides; a Hexagon six Sides; a Heptagon seven Sides; an Octagon eight Sides; an Enneagon nine Sides; a Decagon ten Sides; a Hendecagon eleven, and a Dodecagon twelve Sides. The

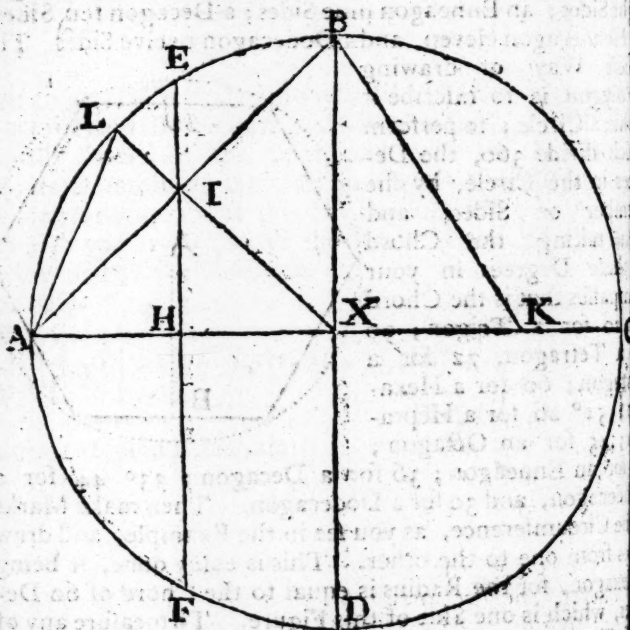
easiest Way of drawing a Polygon is to inscribe it within a Circle; to perform which divide 360, the Degrees in the Circle, by the Number of Sides, and then taking the Chord of these Degrees in your Compasses that is the Chord 120 for a Trigon; 90 for a Tetragon, 72 for a Pentagon; 60 for a Hexagon; 51° 26' for a Heptagon; 45 for an Octagon;

for an Enneagon; 36 for a Decagon; 33° 44' for a Hendecagon, and 30 for a Dodecagon. Then make Marks on the Circumference, as you see in the Example, and draw Lines from one to the other. This is easily done, it being a Hexagon, for the Radius is equal to the Chord of 60 Degrees, which is one Side of this Figure. To measure any of these Figures, you must let fall a Perpendicular from the Centre to the Middle of any of the Sides, and multiply the Sum of all the Sides by one half of the Perpendicular, and the Product will be the Content. Thus if one Side is 10, the Perpendicular, A B will be 8,66, half of which is 4,33; multiply 60, the Sum of the Sides, with this, and the Pro-



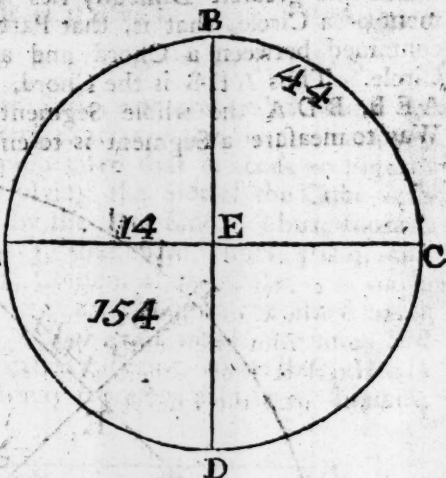
duct will be 259,8, the Content; or which is the same Thing, multiply half the Sum 30 by the whole Perpendicular and the Content will be the same.

To draw a Polygon geometrically in a Circle. Let  $A, B, C, D$ , be the Circle given, cross it with two Diameters at right-Angles. Then open your Compasses to the Semidiameter. Set one Foot in  $A$ , and with the other make Marks in the Circumference at  $E$  and  $F$ . Draw Line from  $B$  to  $F$  and it will divide the Semidiameter in two equal Parts. This done, set one Foot of the Compasses in  $H$  and extend the other to  $B$ . With this opening make a Mark in the Diameter at  $K$ , and draw the Line  $BK$ , and from the Centre  $X$  by the Point where  $BF$  and  $AB$  intersect each other, as at  $I$ , draw the Line  $XI$ . And also draw the Line  $AL$ .



Now observe  $EF$  is the Side of a Trigon or Triangle inscribed in a Circle.  $AB$  is the Side of a Tetragon or Square.  $BK$  is the Side of a Pentagon.  $XA$  is the Side of a Hexagon.  $AL$  is the Side of an Octagon.  $XK$  is the Side of a Decagon. It is usually said that  $BI$  is the Side of a Heptagon, but it wants six Minutes of True

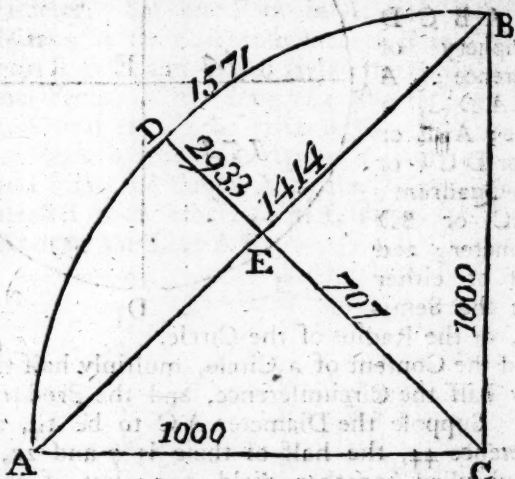
A CIRCLE is so well known, it needs no Definition, but it may be proper to observe that E is the Centre. A B C D the Periphery or Circumference; A C, or A D C, a Semicircle; ABE or ADE, or DCE or DCE is a Quadrant: That AC or BD is a Diameter.; and that half of either is AE is the Semidiameter, or the Radius of the Circle.



To find the Content of a Circle, multiply half the Diameter by half the Circumference, and the Product is the Content. Suppose the Diameter AC to be 14, and the Circumference 44, the half of these is 7 and 22, which being multiplied together, yield 154; but if the Diameter of the Circle only is known, then square the Diameter 14, that is, multiply 14 into 14, and it will make 196; multiply this into the Decimal Fraction .7854, and the Product will be 153.9384, nearly the same as the former. It is often necessary to know the Proportion between the Diameter and the Circumference of a Circle: Now the common Proportion is as 7 to 22, which is only in 3000 too much. If you would be more exact, use the Proportion of 1 to 3.14, or 13 to 355, which is the exactest of all; for it is only one in 333333 different from the Truth.

If you know the Circumference, and would find the Diameter, the Proportion is as 22 to 7, or as 3.14 to 1, or 355 to 113. Any Sector of a Circle, whether a Semicircle or a Quadrant, or more or less, which has one Point or Angle at the Centre of the Circle may be measured by the former Rule; that is, let half the Arch be multiplied by the Semidiameter, and you will have the Content. But

But the greatest Difficulty lies in measuring the Segment of a Circle, that is, that Part of a Circle which contained between a Chord and an Arch of the same Circle. Thus A E B is the Chord, A D E the Arch, and A E B, B D A the whole Segment. The most certain Way to measure a Segment is to enlarge it into a Sector



as in the Example before us: For if you measure the Triangle A B C as is before taught, by letting fall a Perpendicular from C to E, the Measure of which will be 707, the half is 353,5; which being multiplied into A B, the Base will produce 500000, the Content of the Triangle. For the Content of the Sector or Quadrant multiply half 1571, which is 785,5, by 1000, the Radius, and the Product will be 7855000, the Content; then subtract 500000, the Content of the Triangle, from 7855000, the whole Content of the Sector, and the Remainder will be 2855000, the Content of the Segment

The common Way is to multiply two thirds of 293, which is 1954, by 1414, and the Product will be 2762956. This you may find is less than 2855000, almost a 27th Part, and consequently is not so exact as the other Way.

Note, Authors have given various Methods of reducing all Sorts of Plane Figures to a Square geometrically. But all that Labour may be spared by first gaining the superficial Content, and then extracting the Square Root; for that

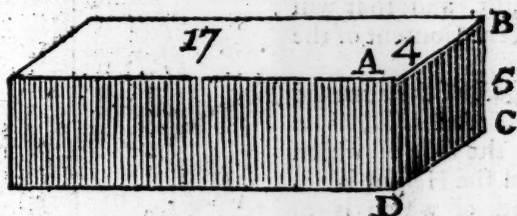


at Root will be the Side of a Square equal to the Content of the Figure, be it what it will.

Of MEASURING SOLIDS.

A CUBE is a square Solid, comprehended under six equal Square Faces, being exactly in the Shape of a Die; which is so easily comprehended that it needs no Figure. It is measured by multiplying the Side of the Cube into itself, and the Product by the same Side. Thus, suppose the Side of a Cube was 3, then three Times 3 is 9, and three Times 9 is 27, the Content of the Cube.

A PARALLELOPIPEDON is a solid Figure contained under six equal Parallelograms, the Opposites of which are equal and parallel. It is otherwise called a PRISM, whose Base, ABCD is a Parallelogram, and may represent a Piece of Timber, one, or the like.



To measure it get the superficial Content of the End, multiply that into the Length, and the Product will give the Content. Thus 4 multiplied into 5 gives 20, the superficial Content of the End; which multiplied into 17, the Length gives 340, the Content of the whole.

A TRIANGULAR PRISM, as ABCD, is measured like



former, only you must obtain the superficial Content of the End, as in other Triangles, by letting fall a Perpendicular, and then multiply the Content by the Length, and

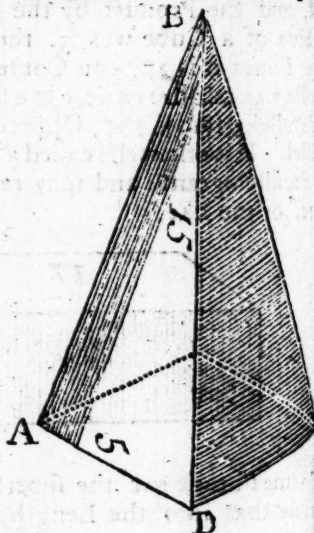
G g

and you will have the Content of the whole. This otherwise called a Prism, whose Base is a Triangle. It is a general Rule for Prisms of all Kinds to get the superficial Content of the Base, and then to multiply it into the Length, and you will have the Content. Thus a Prism may have its Base a Pentagon, Hexagon, Heptagon, &c.

A PYRAMID is a solid Figure, whose Base is a Polygon and whose Sides are plain Triangles, the several Tops

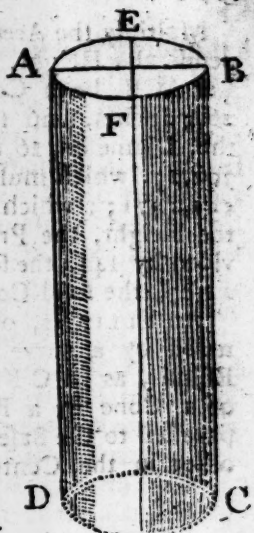
which meet in one Point. The Base of a Pyramid must be measured like the Base of a Prism, for it may consist of three, four, five, six, seven, &c. Sides; and when that is obtained multiply it into one third of the Height, and that will give you the Content of the Pyramid.

The Base of the annexed Pyramid,  $ABCD$ , is a Square, the Side of which is 5, and the Height is 15, one third of which is 5. Then for the Base say, five Times 5 is 25, which multiplied by 5, one third of the Height, makes 125, the Content of the Pyramid.



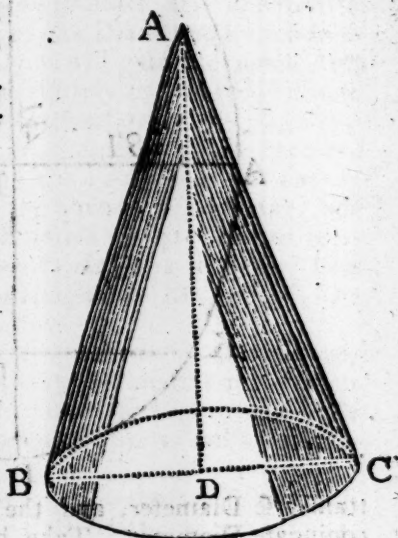
The FRUSTUM of a PYRAMID is the remaining Part when the Top is cut off by a Plane parallel to the Base. To measure it, first get the superficial Content of both the Bases, and multiply them together; extract the Square Root of the Product; add the Content of both Bases to the Root, then multiply the Sum by one third of the Height and you will have the solid Content of the Frustum. For the Side of the great Base of a Quadrangular Frustum is 5, and the lesser 3; the Content of the first is 25, and the second 9; these added together make 34, the Root of which is 5,83; to which add 34, and the Sum is 39,83; which multiplied by 6, one third of the Height, the Product will be 238,98, the Content of the Frustum.

A CYLINDER is a Solid which is produced by the entire Revolution of a Parallelogram about one of its Sides. It is terminated by two Bases, which are equal Circles, described by the two opposite Sides of the Parallelogram. The Stone Roller of a Garden exactly resembles this Figure.



The Diameter of the Base being given, as AB, and the Height AD or BC, you may by that Means find the Area of the Circle at the Base ABFF, which multiplied into the Length, the Product will give the Content of the Cylinder. Suppose the Diameter of the Base AB is 14, multiply it into itself, and the Product will be 896; multiply this again by the Decimal Fraction .7854, and the Product will be 153.938, the Area of the Base: This multiplied by 16 gives 2463.008, the Content of the Cylinder.

A CONE is a Solid which terminates in a point, and is produced by the entire Revolution of a Triangle upon one of its Sides. When the generating Triangle ABD has one of its Angles right at D, it is called a right Cone, because then the Axis will be perpendicular to the Base; but if the Triangle ABD had been oblique, it would have been called an inclined Cone, because the Axis would have been inclined to the Base. I am now speaking of the former.

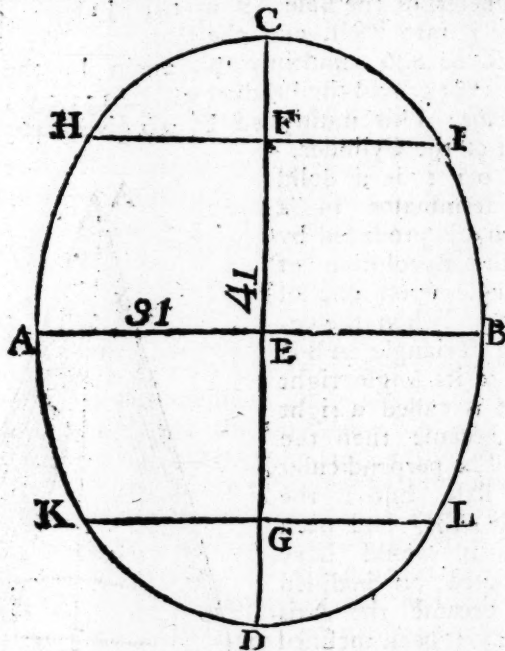


G g 2.

Multiply

Multiply the Area of the Base by one third of the perpendicular Height, and the Product will be the Content. Let ACB be a Cone, the Diameter of whose Base BC 26,5 Inches, and the Height AD is 16,5 Feet; multiply the Diameter 26,5 in itself, and the Product will be 702,25, which multiply by .7854, and the Product will be 551,54715; which multiplied by 5,5 a third Part of the Height, the Product will be 3033,47825; which divided by 144, the square Inches in a Foot, the Quotient is 21,07, the solid Content of the Cone in Feet.

An ELLIPSIS, or mathematical Oval, is a Plane terminated by a curve Line, called the Circumference of the Ellipsis, as A C B D, and is produced from the Section of a Cone by a Plane cutting both its Sides, but not parallel to the Base. It has two Diameters cutting each other in the Centre; the longest, C D, is called



transverse Diameter, and the shortest, A B, is called conjugate Diameter. Take half the transverse Diameter in your Compasses, that is, EC or ED; then set one Foot

the Compasses in A, and extend the other to the Line CD, and at the Point F, where it reaches to make a Mark, as also at G. These two Lines are the Focus's. A Line drawn through these Points from H to I, and from I to L, parallel to the Conjugate Diameter AB, is called the Latus-rectum or right Parameter. These two Lines likewise are called the principal Ordinates. Besides, all Lines at right Angles to the transverse Diameter are called Ordinates.

This Figure was purposely deferred till a Cone was treated of, that it might be better understood; I shall therefore shew how to measure it. Multiply CD 41, the transverse Diameter, into AB, the conjugate Diameter 31, and the Product will be 1271. The Square Root of this is 35,65, which is the Diameter of a Circle equal to this Ellipsis; therefore multiply 1271 by ,7854, as in measuring a Circle, and the Product 998,2425 is the Content of the Ellipsis.

The Frustum of a Cone, or a TRUNCATED CONE, is when some Part of the smaller End is cut off parallel to the Base. To measure this, multiply the Diameter of the two Bases together, and to the Product add one third of the Square of the Difference of the Diameters; then multiply the Sum by ,7854, and you will gain the mean Area between the two Bases, which multiply by the Height, and you will have the Content of the Frustum.

Let the greater Base of a truncated Cone be 15, the lesser 10, and the Height 30; the Product of 10 and 25 multiplied together is 250; the Square of 15 is 225, one third of which is 75, which added to 225 makes 300; multiplied by ,7854, the Product, is 235,62: This Product multiplied by 30, the Height, makes 706,86, the Content of the Frustum.

A SPHERE or GLOBE is a round, solid Body, every Part of whose Surface is equally distant from a Point within it, called the Centre. It is a Figure generally known, and is exactly represented by a Ball perfectly round.

To find the solid Content of a Globe when the Axis Diameter is known, use this Proportion; as 21 is to 11, so is the Cube of the Diameter to the solid Content. Suppose the Diameter or Axis of a Globe to be 18, the

G g. 3.

Cube



Cube of 18 is 5832; then say, as 21 : 11 : 5832 :: 3054 the solid Content of the Globe; or you may multiply the Cube of the Axis by .5236, and the solid Content will be the same.

When the Diameter and Circumference are both known multiply them together, and the Product will be the superficial Content: Multiply this by the sixth Part of the Diameter, and the Product will be the solid Content. Suppose the Diameter to be 18, then will the Circumference be 56.57; this multiplied by 18 gives 1018.26 the superficial Content: This again multiplied by 3, the sixth of the Diameter, the Product is 3054.3 for the solid Content nearly the same as before.

All these Operations may be performed by Logarithms much more exactly, thus:

|                                         |      |
|-----------------------------------------|------|
| Logarithm of 22                         | 1.34 |
| — — — 18                                | 1.25 |
| The Sum                                 | 2.59 |
| Logarithm of 7 subtract                 | 0.84 |
| Remains Log. of the Circumference 56.57 | 1.75 |
| Logarithm of 18                         | 1.25 |
| Log. of the superficial Content 1018.26 | 3.00 |
| Logarithm of 3                          | 0.47 |
| Log. of 3054.3. the solid Content       | 3.48 |

You may perceive by this Method the little Difference arising from multiplying by Fractions is avoided, and the last Product comes nearer the Truth than any other Way, besides, when you are a little used to this Method you will find it much the easiest: But when the Numbers to be multiplied are greater than the tabular Numbers, must proceed the common Way.



Of the measuring Artificers Work, such as Carpenters, Bricklayers, Joiners, Plaisterers, Painters, Glaziers, Masons, and Paviments.

Of CARPENTERS Work.

CARPENTERS Work, as Flooring, Partitioning, and Roofing, is usually measured by the Square of 10 Feet long, and 10 Feet broad, so that one Square contains 100 square Feet.

The Rule is to multiply the Length by the Breadth, and to divide it by 100, and the Quotient will shew the Number of Squares. Thus if a Floor is 57 Feet 3 Inches long, and 28 Feet 6 Inches broad, how many Squares will it contain; you may remember by what has been said before that 5 is the Decimal of one half of any Thing, 75 of three Quarters, 25 of a Quarter, and 125 of half a Quarter; then the Decimal of three Inches, a Quarter of a Foot is 25, and of six Inches half a Foot, is 5. This being considered the Work will stand thus,

$$\begin{array}{r}
 57.25 \\
 28.5 \\
 \hline
 28625 \\
 45800 \\
 \hline
 1631.625
 \end{array}$$

This Product is to be divided by 100, which is expeditiously done by cutting off with a Dash of the Pen the two First Figures of the Integer towards the Right hand, and then the Answer will be 16 Squares and 31 Feet; for the Inches, they are not regarded in this Kind of Measurement.

Suppose a PARTITION is 12 Feet 3 Inches high, and 8 Feet 6 Inches deep, what is the Content?

*Of Measuring.*

$$\begin{array}{r}
 12.25 \\
 82.5 \\
 \hline
 6125 \\
 2450 \\
 \hline
 9800
 \end{array}$$

$$10)10.625$$

The Answer is 10 Squares and 10 Feet.

In ROOFING it is a Rule among the Workmen, that the Flat of a House, that is the Measure from Wall to Wall on the Inside, and half the Flat is equal to the Measure of the Rafters of the Roof of the same House, if it be truly proportion'd; or as the Workmen speak, if it be truly pitched: For if the Roof is more steep or more flat than the true Pitch, the Measure will be more or less in Proportion.

Suppose the Measure from the Inside of one Wall to the Side of the other is 44 Feet 6 Inches in Length, and 3 Feet 3 Inches in Breadth, how many Squares of Roof will cover the House?

$$\begin{array}{r}
 18.25 \\
 44.5 \\
 \hline
 9125 \\
 7300 \\
 \hline
 812.125 \text{ The Flat,} \\
 406 \text{ One Half.} \\
 \hline
 \end{array}$$

$$12)18 \text{ The Sum divided by } 100.$$

So that the Answer is 12 Squares 18 Feet.

*Of BRICKLAYERS Work.*

TILING is measured by the Square of 10 Feet or 100 and is much the same as measuring the Roofs of Carpenters Work, only the Bricklayers must be allowed for the Eaves. They likewise require double Measure for the Hips and Vallies. The Hips are those Pieces of Timber

er which are placed at the Corner of a Roof, and are much longer than the Rafters. The Country Workmen commonly call them Corners; some call them principal rafters, and others Sleepers: But the Truth is, the Sleepers lie in the Vallies, and join at the Top with the Rafters.

When the Gutters are allowed double Measure, the Way is to measure the Length along the Ridge Tiles, and that Means the Measure of the Gutter will become double. It is usual also to allow double Measure at the Eaves, so much as the Projection is over the Plate, which is commonly about 18 or 20 Inches.

Suppose the Tiling of a Roof is 35 Feet 9 Inches in Length on both Sides, the usual Allowance being made for the Eaves, and 43 Feet 6 Inches in Length, how many Squares of Tiling are in the Roof? Proceed as before.

$$\begin{array}{r}
 35.75 \\
 43.5 \\
 \hline
 178.75 \\
 107.25 \\
 \hline
 143.00 \\
 \hline
 15)55.125
 \end{array}$$

The Answer is 25 Squares and 55 Feet.

In Walling, the Workmen measure their Work by the Rod-Square, each Rod containing 16 Feet and a half, which multiplied into itself makes a Rod-Square, containing 272.25 Square Feet. But in some Places a Rod is 18 Feet, and then it will contain 324 Square Feet. The Standard Thickness of a Wall is a Brick and a half; when it is more, it must be reduced to a Standard Thickness, by multiplying the Superficial Feet contained in the Wall, by the Number of half Bricks the Wall is thick, and then one third of the Product will be the Content in Feet so reduced.

Suppose a Wall is 72 Feet 6 Inches long; 19 Feet 3 Inches high, and 5 Bricks and a half thick, how many Rods of Brick-Work will it contain when reduced to the Standard?

*Of Measuring.*

19.25 The Height.

72.5 The Length.

---

9625

3850

---

13475

---

1395.625

11 Half Bricks in Thickn

---

1395625

---

1395625

---

3)15351.875

---

272.25) 5117.291(18

---

27225

---

239479

---

217800

---

68.06)21679(3 Quarters of a Rod.

---

20418

---

12.61

Take notice, that the Number 68.06, by which Remainder is divided, is a Quarter of a Rod; which makes the Answer 18 Rods, 3 Quarters, and 12 Feet.

*Of PLAISTERERS Work.*

PLAISTERERS Work is measured by the Yard-Square or the Square of three Feet, which is 9 Feet. The Rule to multiply the Feet and Inches by each other, and to divide the Product by 9. The Quotient will give Content.

Suppose a Cieling was 59 Feet 9 Inches in Length; 24 Feet 6 Inches in Breadth; how many Yards are contained in that Cieling?

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9 Fe  
four  
eight  
the t  
Note,  
de for  
en Qu  
Bra  
Part  
fect be

JOINER  
Dime



$$\begin{array}{r}
 59.75 \\
 24.5 \\
 \hline
 29875 \\
 23900 \\
 11950 \\
 \hline
 9)1463.875(162.652 \\
 9 \dots\dots\dots \\
 \hline
 56 \\
 54 \\
 \hline
 23 \\
 18 \\
 \hline
 58 \\
 54 \\
 \hline
 47 \\
 45 \\
 \hline
 25 \\
 18 \\
 \hline
 7 \\
 \hline
 \end{array}$$

Observe that the Decimal of one Foot of a Yard Square, of 9 Feet, is 1111, of two Feet 2222, of three 3333, of four 4444, of five 5555, of six 6666, of seven 7777, of eight 8888. So that you see 652 is nearest 666. Therefore the true Answer is 162 Yards and 6 Feet.

Note, That in measuring Walls, Deductions must be made for Doors and Windows. Likewise in rendering between Quarters, you may deduct a fifth Part for the Quarters, Braces, &c. But in whitening or colouring a fourth or fifth Part must be added, when the Quarters and Braces project beyond the Wall.

Of JOINERS Work.

JOINERS Work is measured by the Yard-Square; but Dimensions in taking the Height of any Room are taken

taken by a String, because Cornice Mouldings, and lining Pannels cannot be measured by a strait Instrum<sup>t</sup>. You must begin at the Top and girt all over the Moulding which will make the Room much higher than it is: Whereas in measuring round the Room, they only take it as upon the Floor.

If a Room of Wainscotting, measured according to above Rule, be 12 Feet 9 Inches high, and 96 Feet 10 Inches in Compass, how many Yards of Wainscotting will contain?

$$\begin{array}{r}
 96.25 \\
 12.75 \\
 \hline
 48125 \\
 67375 \\
 19250 \\
 9625 \\
 \hline
 9)1227.1875(136.3541 \\
 \underline{9} \\
 32 \\
 \underline{27} \\
 57 \\
 54 \\
 \hline
 31 \\
 27 \\
 \hline
 48 \\
 45 \\
 \hline
 37 \\
 36 \\
 \hline
 15 \\
 9 \\
 \hline
 6
 \end{array}$$

3541 is the nearest three Square-Feet, and therefore Answer is 136 Yards and three Square-Feet.

Observe that Deductions are to be made for all Window-Lights; and that the Window-Boards, Soffit-Boards, and Pannels must be measured by themselves. Likewise that Doors, Window-shutters, and other Work that is bought on both Sides, when it is measured, the Joiner is paid for Work and half Work; that is, when you have found the Content you must halve it, and add the half to the former Sum, which will be the Content of the Work a Half.

*Of PAINTERS Work.*

PAINTERS Work is measured in the same Manner as that of Joiners, by girting over the Mouldings, and swelling Pannels when you take the Height. When this is done you are to proceed exactly in the same Method. He is paid for his Work according to the Times it is coloured over; he paints the Window-Lights, Window-Bars, and Casements, &c. at so much per Piece.

*Of GLAZIERS Work.*

GLAZIERS measure their Work by the Foot square, so that the Length and Breadth being multiplied together in the Table produce the Content. They are commonly so exact to take their Dimensions to a Quarter of an Inch; and in multiplying Feet, Inches, and Parts, the Inch is subdivided into twelve Parts, as the Foot is, and each twelfth part into twelve others.

Suppose a Pane or Light of Glass is 4 Feet, 8 Inches  $\frac{1}{2}$  long, and 1 Foot, 4 Inches, and  $\frac{1}{4}$  broad, how many Feet will it contain?

The Decimal of 8 Inches and  $\frac{1}{2}$  is .729. The Decimal of 4 Inches and  $\frac{1}{4}$  is .359, as you may see in the Decimal Table of a Foot the Integer.

$$\begin{array}{r} 4.729 \\ 1.359 \\ \hline 18916 \\ 23645 \\ 14187 \\ 4729 \\ \hline 6.403066 \end{array}$$

that the Answer is 6 Feet and almost 5 Inches.

H h

of

## Of MASONS Work.

MASONS Work is generally measured by the Foot sometimes superficially, and sometimes according to the Solidity. Suppose a Pavement is 96 Feet long, and Feet, 9 Inches wide, how many superficial Feet will contain: Remember that the Decimal of 9 Inches, three Quarters of a Foot is .75, and then the Work will stand thus.

$$\begin{array}{r}
 16.75 \\
 .96 \\
 \hline
 10050 \\
 15075 \\
 \hline
 1608.00
 \end{array}$$

So that the Answer is 1608 Feet.

Suppose a Wall to be 64 Feet, 6 Inches long, 20 Feet 6 Inches high, and 2 Feet 3 Inches thick, how many Square Feet will it contain?

$$\begin{array}{r}
 64.5 \text{ The Length.} \\
 20.5 \text{ The Height.} \\
 \hline
 3225 \\
 12900 \\
 \hline
 3322.5 \\
 2.25 \text{ Thickness.} \\
 \hline
 661125 \\
 264450 \\
 264450 \\
 \hline
 2975.062
 \end{array}$$

In some Parts of the Kingdom, Walling is measured by the Rod of 63 Feet, superficial Measure, and then Thickness is allowed for in the Price agreed upon.

Suppose a Wall to be 89 Feet, 3 Inches long, and Feet, 6 Inches high; how many Rods will it contain of Square Feet?

$$\begin{array}{r}
 89.25 \\
 15.5 \\
 \hline
 44625 \\
 44625 \\
 8925 \\
 \hline
 63)1383.375(21 \\
 126 \\
 \hline
 123 \\
 63 \\
 \hline
 60 \\
 \hline
 \text{—}
 \end{array}$$

The Answer is 21 Rod and 60 Feet.

Of PAVIOURS Work.

PAVIOURS Work is measured by the Yard, so that nothing else is necessary, but to multiply the Length by the Breadth and you will gain the Content. If it was measured by the Foot, divide the Product by 9 to bring it into Yards. This is so easy, that an Example is not necessary.

Of MEASURING TIMBER.

THE Measuring of Boards is exactly the same as the Measuring a Parallelogram, before taught. Suppose a Board is 13 Feet long, and 16 Inches broad; how many Feet will it contain? Multiply 16 by 13 and the Product will be 208; divide it by 12, the Number of Inches in a Foot, and it will give 17 Feet, with 4 the Remainder, which is a Quarter of twelve, and therefore is the third Part of a Foot. Or turn 13 Feet, the Length, into Inches by multiplying them by 12, and the Product will be 156 Inches. Multiply this by 16 Inches, the Breadth, and the Product will be 2496. Then divide

H h 2



vide it by 144, the Number of Inches in a Foot square and the Quotient will be 17 Feet, with 48 remaining which is the third Part of 144; the same as before.

A square Piece of Timber which has equal Bases, Sides being strait and parallel, is the same as a Paralelopipedon, the Measuring of which has been taught before and therefore need not be repeated: I shall only give an Example in Feet and Inches.

Suppose the Side of a square Piece of Timber is 15 Inches, and the Length 18 Feet. Multiply 15 by 15 and the Product will be 225. Multiply this again by 18 Feet the Length, and the Product will be 4050. Divide this last by 144, the square Inches in a Foot, and the Quotient will be 28.125 which is just 28 Feet and half Quarter, the solid Content. When the Timber is broader than it is deep, multiply the Depth, Breadth and Length together, dividing the Product by 144, and you will have the Content.

Tapering Timber, by some called unequally square Timber, is properly the Frustum of a Pyramid, or truncated Pyramid. The Measuring this has been before taught; but an Example in Feet and Inches will make more plain.

Suppose a Piece of Timber, the Side of whose Square is 25 Inches at the greater End, and 9 Inches at the lesser End, the Length being 20 Feet.

The An  
ch may  
The Ba  
Measu  
Cafe i  
t, whic  
nce you  
another V  
ch I sha

# Of Measuring.

353

625 The Square at the End.

81 The Square at the other End.

50625 Product.

225 Square Root of it.

706 Content of both Bases added.

931 Sum

6.6666 One third of the Height.

5586

5586

5586

5586

5586

144)6206.6046(43.1014 Quotient.

576

446

432

146

144

204

144

606

576

30 Rem.

The Answer is 43 Feet and a little more than one Inch, which may be neglected.

The Base of round Timber is the same as a Cylinder, Measuring of which has been already shewn. In

Case it is common to put a String round to find the

which is the Circumference, and from that Circum-

ference you may find the Diameter. See *Cylinder*. But there

another Way to measure the Content or Area of the End,

which I shall now shew. Square the Circumference or multiply

H h 3

tiply

tiply it into itself, which is the same Thing. Then multiply the Product by .07058, and that will give the Content or Area. Multiply this Area by the Length of the Timber, and the Product will shew the Length of the whole which may be reduced into Feet, by dividing the said Product by 144.

Suppose the Girt of a Piece of round Timber is 96 Inches, and the Length 18 Feet, proceed thus :

$$\begin{array}{r}
 96 \\
 \hline
 96 \text{ the Girt or Circumference} \\
 576 \\
 864 \\
 \hline
 9216 \text{ the Product} \\
 .07058 \text{ Multiplier} \\
 \hline
 73728 \\
 46008 \\
 \hline
 82944 \\
 64512 \\
 \hline
 73340928 \text{ the Area} \\
 18 \text{ Length} \\
 \hline
 586727424 \\
 73340928 \\
 \hline
 13201.36704 \text{ the Product} \\
 144) 13201.36704 (91.67616 \\
 1296 \\
 \hline
 241 \\
 144 \\
 \hline
 973 \\
 864 \\
 \hline
 1096 \\
 1008 \\
 \hline
 887 \\
 864 \\
 \hline
 230 \\
 144 \\
 \hline
 864 \\
 864 \\
 \hline
 \end{array}$$

The true Answer 91 Feet and .67616 Decimals of a Foot.

Note, After 91.67 was in the Quotient, there was no Reason to proceed farther. But I was unwilling to stop short, lest it should be looked upon as a Neglect.

Tapering round Timber, that is round Timber with unequal Bases, is to be measured exactly in the same Manner as the Frustum of a Cone, which it properly is. But as that depended on the Diameter, I shall now shew how to perform it by the Girt or Circumference. The Rule is to subtract the lesser Diameter from the greater, and to square the Difference. Add one third of this to the Circumferences of the Girts multiplied together, and the Sum will be the mean Circumference squared. Multiply this Sum by .07958, and the Product will be the mean Area. This multiplied by the Length of Timber gives the solid Content.

Suppose the Circumference of a Piece of Timber, at one end, to be 136 Inches, and at the other 32 Inches, the Length being 21 Feet; how many Feet of Timber will it contain: See this Sum worked in the following Page.

356

## Of Measuring.

136 First Girt

136

32 Second

32

472

104

Difference of the Girts

408

104

4352 Product

416

1040

10816 The Square

3605.333 One third of the Square

4352. Product of the Girts added

7957.333 Square of the mean Girt

.07958 Common Multiplier.

63638664

39786665

71615997

55701331

633.24456014 Mean Area  
21 the Length63324456014  
12664891202813298.13576294 Solid Content  
144) 13298.13(92.34  
1296

338

288

508

432

693

576

117

The Answer is 92.34 Feet.





## OF SURVEYING.

**T**HE Art of surveying or measuring Land, and the laying it down in a Draught or Map, so as to determine the Content in Acres, Rods, &c. require the Use of several Instruments, such as the Plain Table, the Theolite, the Semi-Circle; a Compass, a Chain, and a Protractor.

The Plain Table is a Board about 15 Inches broad, and 2 long, surrounded with a Frame: There is a Brass Center in the Middle, from which are projected 360 Degrees, that is, all the Degrees of a Circle. Every 10th Degree is number'd both Ways, to save Substraction. On the other Side it is usual to project a Semicircle, divided and number'd in the same Manner; that is, 180 Degrees numbered both Ways. A Compass is generally fitted to this Table to set it North and South, and a Ruler and Index with Sights. This Table is fixed to a three-legged Stand by a Ball and Socket, on which it may be readily turned round, and then fixed to a Point with a screw. But this and the other Instruments may be better known by viewing them in the Shop of a Mathematical Instrument-Maker, than by any Description that can be given.

There are two Sorts of Chains, but that called Gunter's Chain is most in Use. It contains 4 Poles, or 66 Feet: It is divided into 100 Links, each Link containing 7.92 inches.

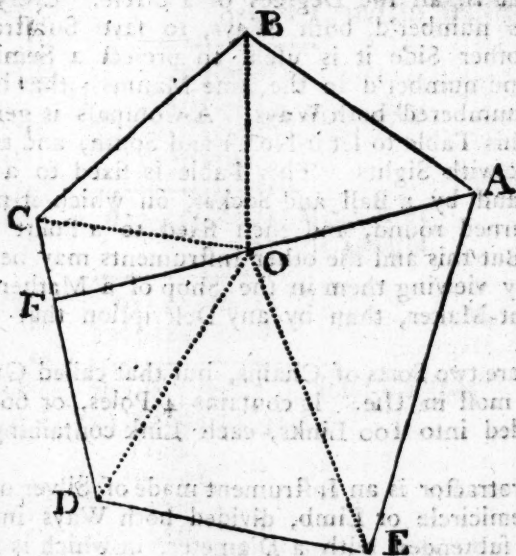
The Protractor is an Instrument made of Silver or Brass with a Semicircle or Limb, divided both Ways into 180 Degrees, subtended with a Diameter, in which is a little Notch to be used as a Center.

There has been so much already said about the Dimensions of plain regular Figures, that it needs not be here repeated. But there are few Pieces of Ground of so simple a Form, and therefore in measuring a Field it will be necessary to reduce it into Triangles, for the Sake of a more certain and easy Measurement. The most common

Figure

Figure of a Piece of Land is a Trapezium, consisting of four unequal Sides and four unequal Angles: However there are some Fields which consist of 5, 6, 7 Sides, or more, and though these Sides are measured ever so exactly it will not be sufficient without knowing the Angles.

Suppose A B C D E to be a Field, the Plot of which is to be taken; choose a Spot near the Middle of it, from whence all the Corners or Angles of it are to be seen, place Marks in every Angle that may be plainly distinguished: If all the Angles cannot be seen from one Station, place upright Poles at those Angles that require it, and that will save you the Labour of making Observations at two Stations; then with a Theodolite, having telescopic Sights, which is best, or with the plain Table prepared to take the Angles from your Station; fix your



Instrument at the Station O, taking Care that the fiducial Edge of your Instrument passes through the Center on the Table, cutting it perpendicularly at 360 and 180 Degrees, then turn about the Table on the Staff-Head till you see the Angle or Corner A, taking Care that 180 is next your Eye; screw it fast, and then looking backwards, cause a Mark to be set up in the Line C D, at the Point F, the

you may be sure the Instrument is kept firm from moving during the Work: And now the Line A O F passing on the Land from the Angle A, directly under the Sights of the Instrument, to the Mark at F, is the prime Diameter from whence the Degrees of the Angles are to be numbered; and accordingly you are to mark the Angle A with 360 Degrees in your Field-Book; then you turn the Index till you see B, keeping it in a due Position. If you make Use of a Telescope, till the Hair therein cuts the Mark at B, and the Edge of the Index, we will suppose, cuts the Frame at 76 Deg. 15 Min. which I set down for the Angle A O B, then turn the Sight to C D and E, and set down the Angles.

This done, you must measure the Distances from the Station to each of the Angles: These and the Angles suppose to be as follow:

*Ch. L.*

|   |     |    |        |   |    |
|---|-----|----|--------|---|----|
| A | 360 | 0  | O to A | 4 | 20 |
| B | 76  | 15 | O to B | 4 | 3  |
| C | 157 | 35 | O to C | 3 | 84 |
| D | 225 | 20 | O to D | 5 | 35 |
| E | 278 | 0  | O to E | 6 | 6  |

The Distance from

The Angles are thus distinguished, that they may be more readily laid down by the Protractor, otherwise it would have been more proper to have said, the Angle A O B is 76.15; the Angle B O C 71.20; the Angle C O D 67.45; the Angle D O E 52.40; and the Angle E O A 82 Degrees.

When you measure the Distance with the Chain, you must have two straight Staves, each about five Feet long; likewise nine Arrows or small Sticks, each about two Feet long, shod with Iron Ferrols at one End, and Pieces of Rag tied to the other; then let him that leads the Chain take the nine Arrows and one of the Staves, likewise he that follows the other Staff: Then the Follower remaining at the Station, the Leader must proceed with the Chain towards A, or any other Angle, the Follower taking Care that he proceeds in a right Line towards the Mark at A. This done, let the Leader fix his Staff at the End of the Chain in the same right Line, that the Follower may see whether he is exact or not; if he is, let him take up the Staff and fix one of the Arrows in its Place,

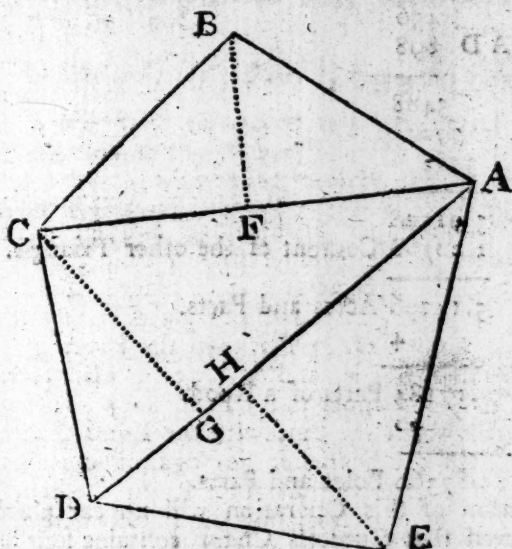
Place, proceeding in the same Manner till the Whole measured, leaving an Arrow at the End of every Chain.

When you are come so near the Mark at A as to be Distance less than a Chain, you must number the Link which may be readily done by the Bits of Brass, or other Marks at the End of every tenth Link; after this count the Arrows to find the Number of Chains, and put the down in your Field Book. If it should be six Chains, 6 Links, you must not put down 66; for as every Chain 100 Links, you must write down 606, and six Chains without any Links, must be called 600.

To protract the former Observations, you may draw the Line A F upon Paper at Pleasure, and let it be long enough; then in the Middle stick a Pin, against which the Center of the Protractor may be placed, and the straight Line must be placed on the straight Line A F: By the Help of this you must make a Prick on the Paper at 76 Degrees 15 Minutes for B, and at 175.35 Minutes for C according to the Number in the Field Book; then turning the Protractor about the Pin, with the Limb down towards D and E, till the Diameter lies against the Line A F and numbering downward from the Right, beginning with 190, 200, &c. and over-against the Place where 225 Degrees 20 Min. and 278 Deg. 50 Min. fall, you must prick the Paper at the Side of the Limb: But if the Protractor has only 180 Degrees, you must subtract 180 from the aforesaid Numbers, and proceed with the Remainders. Then done, Lines must be drawn from the Center through the aforesaid Points, upon which, by Help of a Diagonal Scale I prick down the Chains and Links from the Center, and then draw Lines from A to B, B to C, and so on. Then done, you will have the true Plot of the Field.

To obtain the Content it must be reduced into Triangles, as in the adjacent Figure A B C D E, by drawing Lines from one Angle to another; and then you will have ABC, ACD, and ADE, letting fall the Perpendiculars BF, CG, and EH. Now if your Plot is carefully and truly drawn, you may measure the Diagonals and Perpendiculars, and proceed to find the Content of each Triangle. Thus the Diagonal AC is 796; the Diagonal AD 896; BF 316; CG 452; and EH 420: Then multiply the whole Diagonal by half the Perpendicular, and you will have

are the Content of each Triangle. Thus AC 796, multiplied by 158, half BF, and the Product will be 122768; and AD 898 by 226, the half of CB, and the Product will be 202948; likewise AD 898 by 210, the half of EH



the Product will be 188580; add these together, and the Sum will be the Content of the whole in Links thus:

122768

202948

188580

---

514296 Links

it is observable that in all Trapeziums some of this labour may be saved: So here if the Triangle ABC be taken from the Figure, the Remainder is ACDE. In which Case both the Perpendiculars will fall on the same line; therefore add CG and EH together, and take one half of the Sum, which multiply into the Diagonal AD, and the Product will be the Content of the Trapezium.



|             |      |
|-------------|------|
| CG          | 452  |
| EH          | 420  |
| Sum         | 872  |
| Half        | 436  |
| Diagonal AD | 898  |
|             | 3488 |
|             | 3924 |
|             | 3488 |

Product 3.91528

1.22768 Content of the other Triangle.

5.14296 Acres and Parts.

4

.57184 Parts of a Rood.

40

22.87360 Poles and Parts.

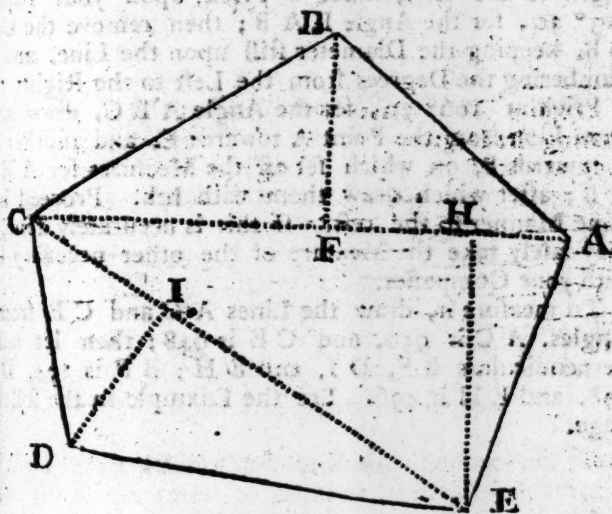
The Reason of this Operation will appear plainly, it be observed that Gunter's Chain contains four Statute Poles, or 100 Links, so that any Number of Chains is so many hundred Links, as five Chains is 500, six Chains is 600, &c. likewise 160 Statute Poles in an Acre, each Pole being 16 Feet and a half. There is also 16 square Poles in a Chain: If therefore you divide the square Poles in an Acre by the square Poles in a Chain, the Quotient will be 10, the square Chains in an Acre: Multiply 100, the Chain into itself, and the Product will be 10000 the Links in a square Chain. Multiply this by 10, the square Chains in an Acre, and the Product will be 100000 the square Links in an Acre.

Now as there are 391528 Links in the Content of this Piece of Ground, if you divide them by 100000, the square Links in an Acre, which is done by cutting off five Figures towards the Right Hand, the Number of 0's 100000, the Quotient will be five Acres, and 14296 Parts. If these Parts are multiplied by 4, the square Roods in an Acre, and then cut off five Figures to the Right, the

to the Left will be Roods; multiply these Parts by 40, the square Poles in a Rood, and from the Product cut off five Figures as before, and the Remainder will be Poles: Thus in the preceding Sum there are five Acres and 22 Poles, but no Rood.

*To take a Plot of a Field by measuring round it.*

Let A B C D E be the Figure of a Field to be surveyed; and whose Plot is required, in order to which the Sides and Angles must be all measured. You may begin at any of the Angles: Suppose at A. Having prepared your Instrument, turn your Index about till you see the



Angle at B, and then fix it fast; then turn the Sights to E, and observing how many Degrees it cuts, set them down in your Book; then remove your Instrument to B, and observe that Angle in like Manner, proceeding afterwards to the rest; then with your Chain measure the Sides A-B, B C, C D, D E, E A, setting them down as they are measured. When you have done all, the Work will stand thus:

I i 2

Angles.

| Angles. | Deg. | M. | Sides. | Ch. |
|---------|------|----|--------|-----|
| E A B   | 113  | 30 | A B    | 546 |
| A B C   | 106  | 30 | B C    | 638 |
| B C D   | 111  | 0  | C D    | 412 |
| C D E   | 111  | 0  | D E    | 710 |
| D E A   | 100  | 30 | E A    | 524 |

Some make a Distinction between Chains and Links, it is unnecessary, because the Hundreds are always Chains and the Overplus Links.

To protract these Observations, take the Length of Side A B in your Compasses from the Scale, and make two Pricks on your Paper, between which draw a Line, then lay the Diameter of your Protractor upon it, with the Center at A, and numbering the Degrees from Right to the Left, make a Prick upon your Paper at  $113^{\circ} 30'$ , for the Angle E A B; then remove the Center to B, keeping the Diameter still upon the Line, and numbering the Degrees from the Left to the Right, make a Prick at  $106^{\circ} 30'$ , for the Angle A B C, draw an obscure Line from the Point A towards E, and another from A towards B, on which set off the Measures for A E and A B; after which draw them with Ink. Proceed in the same Manner to the rest. If this is accurately done, you may safely take the Measure of the other necessary Lines with your Compasses.

To measure it, draw the Lines A C and C E from the Angles, A C is 950, and C E is 948; then let fall Perpendiculars B F, D I, and E H; B F is 354, D I is 298, and E H is 496. See the Example in the following Page.

DI 298

M 496

CE 948

394 Half the said Sum.

um 797

alt 397

6636

8532

2844

376356 Content of the Trapezium ACDE.

A C 950

Half B F 177

6650

6650

950

168150 Content of the Triangle A B C.

376356

544566 Acres and Parts.

4

.78024 Parts of a Rood.

40

31.20960 Poles and Parts.

The Content is 5 Acres and 31 Poles.

If the boundary Lines are not strait, the Pieces of Land about the Lines must be reduced to Parallelograms, or Angles, in the best Manner you can; and when the Contents are obtained, you must add them to the former to complete the Whole.

These two Methods are sufficient to find the Number Acres in any Field, and this last is generally prefer'd to any other, as being less liable to Error. If the East or North Part of the Field is required, you must find the Situation of it by a good Compass, making Allowance for the Variation of the Needle.

I i 3

Obfer-

*Observations on measuring Land in common Fields.*

When plough'd Lands in common Fields are to be measured by the Chain, it is usual to measure the Length down the Ridge, and to take the Breadth at the Top, the Middle, and at the Bottom, and then adding the three Numbers together, to take one Third of the Sum for the mean Breadth; but it is by no Means advisable to take the Breadth of the Land very near the Top or Bottom, because the Turning of the Plough generally makes it broader or narrower: And if in measuring the Breadth down the Land you find considerable Variation, it will be best to measure cross the Lands oftener, adding the several Sums together, to divide the whole by the Number of those Sums; that is, if you have measured it six Times, you must divide the whole by 6, and the Quotient will give the mean Breadth.

The several Furlongs in common arable Lands, may be accounted as so many particular Inclosures, and measured after the same Manner, by setting up Marks at the extremities of the Furlongs, and measuring the Angles with the Theodolite or plain Table; and as you pass along the Station Lines, you may from thence take the Off-sets to each Man's particular Lands, and against the Off-sets write the Name of the Owner or Tenant, adding the Distances and Boundings in your Draught.

Note, That in the Survey of a large common Field will be safer to divide it into Parcels, as separate Fields, keeping good Marks at the Stations, than to venture the closing of a Plot by going round it all at once, and dividing it into Parcels afterwards.

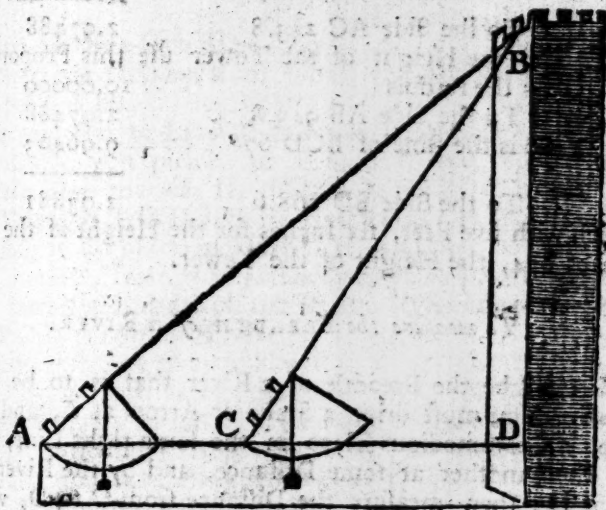
*Of taking Heights and Distances.*

Any Height may be taken with Gunter's Quadrant, by the Square near the Center at one Observation, if there be free Access to the Foot of it. In this Case you have nothing to do but to approach nearer to it, or to go further from it till you see the Top of a Tower or other Object through the Sights, and the Thread falls exactly on the Diagonal of the Square, or which is the same Thing cuts the Limb of the Quadrant at 45 Degrees; and



The Height of the Place above the Eye will be equal to the Distance of the Place from the Eye horizontally: Therefore measure the Distance from the Station to the Foot of the Object, to which add the Height of the Eye, and you will have the true Height without farther Trouble.

Suppose BD, the Height of the Tower, I mean that Part of the Tower at D that is level with the Eye; go



backward or forward till the Thread falls on 100 in the Square, or 45 Degrees of the Limb, and then BD will be equal to AD, whatever the Measure of AD may be: But if any Thing prevents you from going so far back from the Tower as to gain an Angle of  $45^\circ$ , you may take an Angle of  $60^\circ$ , and then the Height of the Tower will be double the Distance from the Tower.

When you cannot come to the Foot of the Tower, by reason of Water, or some other Impediment, it is called an inaccessible Height, and the proper Way to measure it will be by taking the Angles at two Stations, and then by measuring the Distance between those Stations. Suppose the Angle BAD  $45^\circ$ , the Angle BCD  $67^\circ$ , and the Distance between A and C 500 Feet: Now as the Angle BCD is 67, the Complement to  $90^\circ$  is  $23^\circ$ , the Angle CBD, and the Complement of the Angle at A is  $45^\circ$ , the Angle



suppose to be 125 Feet, then with a Theodolite take the Angle  $BCD$   $73^\circ$ , and the Angle  $BDC$   $58^\circ$ , add these together, and the Sum will be  $131^\circ$ ; subtract this from  $180^\circ$ , and the Remainder will be  $49^\circ$ , the Angle at  $B$ . Then say,

|                                                |         |
|------------------------------------------------|---------|
| As the Sine of the Angle at $B$ . Comp. Arith. | 0.12222 |
| To its opposite Side $C$ 125,                  | 2.09691 |
| So is the Sine of the Angle at $D$             | 9.92842 |

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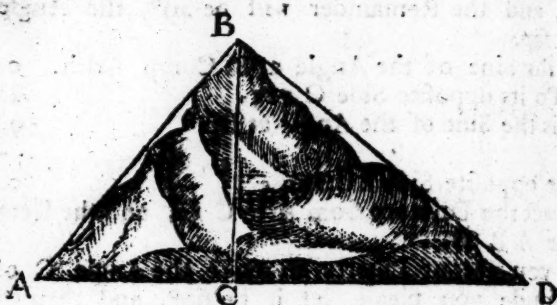
To the opposite Side  $BC$  140.5      2.14755  
 Subtract the Distance from  $A$  to  $C$  52, and the Remainder will be  $AB$  88.

As you are at Liberty to make the Angle  $C$  of what Magnitude you please, let it be  $60^\circ$ , and then carry on a straight Line towards  $D$ , till the Angle  $BDC$  is  $60^\circ$ , and the Triangle  $BCD$  will be equilateral; so that you have nothing to do but to measure  $CD$ , and then you will have the Line  $BC$ , from which subtract 52 as before, and you will have the Breadth of the River. The annexed Triangle  $BCD$  is of this Kind.

Otherwise you may make  $BHF$  a right Angle, and then go forward along the Line to  $F$ , till  $BFH$  is an Angle of  $45^\circ$ ; in which Case  $FBH$  will also be an Angle of  $45^\circ$ , and the Triangle  $FBH$  will be an Isosceles; in-much that measuring from  $H$  to  $F$ , 548 Feet, you will have  $HB$  of the same Length; then subtract the Distance from  $H$  to  $A$ , and you will have the Breadth of the River.

If the Nature of the Soil will not permit you to go so far as  $F$ , go along the same right Line till you come to  $E$ , where the Angle  $BEH$  is  $60^\circ$ ; then will  $EB$  be twice the Length of  $EH$ , which we will suppose to be 100, then will  $EB$  be 200; square them both, and you have 10000 and 40000; subtract the lesser from the greater, and the Remainder will be 30000. The Logarithm of this is 5.47712, half of it is 2.73856; the Number which corresponds with it is 547.7, the Root which is the Length of the Side  $BH$ .

To find the Horizontal Line of a Hill or Mountain.  
Let ABD be the Hill, then set a Mark on the Top



B, equal to the Height of the Instrument that is fix'd the Foot of the Hill, from whence you are to make your Observation; take the Angle BAC, which we will suppose to be  $50^\circ$ ; then consequently the Complement to that, will be the Angle ABC; then measure from A to B, which is 346 Feet. This done, the Method of finding AC, a Part of the Line AD, is by the following Analogy.

|                                             |        |
|---------------------------------------------|--------|
| As the Radius                               | 10.000 |
| To the Side AB 346                          | 2.737  |
| So is the Sine of the Angle at A $50^\circ$ | 9.808  |
| To the Side AC 351                          | 2.545  |

Now as the Hill descends on the other Side, you must fix a Mark at the Bottom, and directing the Sights to the Mark take the Angle CBD  $50^\circ$ ; consequently the Angle CBD will be  $40^\circ$ ; then measure down the Hill to C, and you will find it 631.2; which done, say,

|                                 |        |
|---------------------------------|--------|
| As the Radius                   | 10.000 |
| To the Side BD 631.2            | 2.808  |
| So is the Sine of the Angle CBD | 9.808  |
| So the Side CD 405.8            | 2.608  |

Now if you add 351 to 405.8, the Sum is 756.8, the Length of the Horizontal Line AD, which is to be subtracted when you take the Plot of a Field.

the GAUGING of CASKS, designed for Beer,  
Ale, or Wine.

GAUGING, in general, is nothing more than the Application of the Rules for measuring Solids to particular Vessels of different Dimensions, used by Brewers, Wine-Merchants. &c. It is defined to be the Art of measuring the Capacities or Contents of all Kinds of Vessels, and determining the Quantities of Liquors or other Matters contained therein. It is comprehended under that Branch of the Mathematics called STEREOMETRY, because the Capacities of all Kinds of Vessels used for Liquors are cubical, parallelipedal, cylindrical, spheroidal, conical, &c. and are computed as though they were in Real solid Bodies. The Vessels most usually gauged are Kilderkins, Hogheads Barrels, Runlets and Casks; also Backs, Coolers, and Vats.

The Vessels in the Shape of a Cube, Parallelipedon, Prism, may be found by multiplying the Area of the Base by its perpendicular Height, as has been before shewn. Casks of the usual Form, such as Hogheads, Kilderkins and Pipes, may be considered as the Segments of a Spheroid cut off by two Planes, which brings them under Oughtred's Theorem for measuring Ale and Wine Casks, which is this; add two Thirds of the Area of the Circle at the Bung, to one Third of the Area of the Circle at the Head, and then multiply the Sum by the internal Length of the Cask, and the Product is the Content of the Cask in cubic Inches.

Suppose the Diameter at the Head of a Vessel to be 32 Inches, and at the Bung 32, and the Length 40 Inches, then for the Circumference of the Head say, as  $7.32::18:137$ . The half of 137 is 68.5; this multiplied by half the Diameter, produces 263.565, for the Area at the Head, one Third of which is 87.85. For the Circumference at the Bung say, as  $7:2::32:100.57$ . The half of 100.57 is 50.28, which multiplied by 16, half the Diameter, produces 803.48 for the Area at the Bung. Two Thirds



Thirds of this Area is 535.66 which added to 87. makes 623.51, which multiplied by 40, the Length, the Product is 24930.40 the Content of the Vessel in cubic Inches.

To find the Number of Wine or Ale Gallons it contains, divide 24930.40 by 231 for Wine Gallons, and 282 for Ale Gallons, and the respective Quotient will give the Number, namely, 107.9 for the former, and 88.4 for the latter.

But the usual Method of gauging is by Everard's Sliding Rule, which is made of Box, and is a Foot and an Inch long, with two small Scales to slide in it, one of which being drawn out to the Right Hand, and the other to the Left, will make it near three Feet long.

The Lines on this Rule are two of Gunter's Lines, Lines of Numbers, marked with the Letter D, beginning at the End of the Rule towards the Left Hand, and from thence continued to the other End. A, B, and C are called double Numbers, each being two Lines or Radii of Numbers. The Line is called triple Numbers, having three Radius's of Numbers. On the Line A are four Brass Center Pins, two in each Radius; one in each of which are marked MB, to shew that 21050.42, the Number is set against, is the Cubic Inches in a Malt Bushel. The other two are marked with A to shew that 282, the Number they are set against, is the Cubic Inches in an Ale Gallon.

Close to the Figure 7 in the first Radius, on the first Line is a Dot, marked  $\frac{7}{8}$ , set exactly over-against 707 denoting 707 to be the Side of a Square inscribed in a Circle, whose Center is Unity. Close to 9 is another Dot marked  $\frac{9}{8}$ , set over 886, which is the Side of a Square equal to the Area of a Circle, whose Diameter is Unity. Another Dot near W is set over 231, the cubic Inches in a Wine Gallon; and another near C is set over 3.141592, the Circumference of a Circle whose Diameter is Unity.

The Line MD, signifying Malt Depth, is nothing but a Line of Numbers in a reverse Order, the Number 1 being set directly against MD on the first Radius, is useful to cast up Malt Gauges. On the Line D there are four Center Pins; the first, marked WG, is the Ga-

point of a Wine Gallon; that the Diameter of a Cylinder, whose Height is one Inch, and Content 231 cubic Inches, or a Wine Gallon, which is 17.15 Inches: The second Center Pin, marked A G, stands at the Gauge Point for an Ale Gallon, which is 18.95 Inches: The third, M S, stands at 46.3, the Side of a Square, whose Content is equal to a solid Bushel: The fourth, M R, is the Gauge Point for a solid Malt Bushel, which is 52.32 Inches.

The two Lines of Segments are each numbered from 1 to 100. The first is for finding the Ullage of a Cask, taken as the Middle Frustum of a Spheroid, lying with its Axis parallel to the Horizon; and the second to find the Ullage of a standing Cask. On one of the narrow Sides noted *e*, is a Line of Inches, numbered from 1 to 12, and each subdivided into 10 Parts. A Line, by which, with that of Inches, we may find a mean Diameter for a Cask in the Figure of the Middle Frustum of a Spheroid. A Line for finding the mean Diameter of a Cask in the Figure of a Middle Frustum of a parabolic Spindle. A Line for the third Variety, which is of a Cask of the Figure of two parabolic Conoids, abutting on a common Base.

On the other narrow Side marked *f*, is a Foot, divided into equal Parts, marked F M: A Line of Inches noted M; a Line, F C, for finding the mean Diameter of the fourth Variety of Casks, which is the middle Frustum of two Cones, abutting on a common Base. On the Back Side of the sliding Piece is a Line of Inches from 13 to 36, when the two Pieces are put Endways; and against that the corresponding Gallons, or hundred Parts, that any small or like open Vessel from 13 to 36 Inches Diameter will contain at one Inch deep.

The Use of this Rule is very great in Arithmetic, as well as Measuring; but I shall only mention one at present, particularly the Area of a Circle, which may be easily found by the Help of the fixed Numbers called the Gauge Point. These Numbers are Diameters of those Circles, whose Content at one Inch deep is equal to the respective Gallons to which they belong. They are the Square Root of the Divisions last mentioned; that for W G 18.95; for W G 17.15 on the Rule: Thus, set 18.95, the Gauge Point for Ale Gallons, upon D, to 1  
K k  
upon

upon C, then against any Diameter upon D you have the Area upon C. Note, when the Area of any Circle is sought in Ale Gallons, if the Diameter be more than 18.95, and less than 100, set the Gauge Point upon D one upon C; but when the Gauge Point is less than 18.95, or more than 100, then set the Gauge Point the Middle upon C. Lastly, to find any Part of the Area, set the Gauge Point to  $\frac{1}{2}$ ,  $\frac{1}{3}$ , or any other Part of 1; then against the Diameter you have the like Part of the Area.



Useful

USE

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## USEFUL RECEIPTS of various Kinds.

*To make BLACK INK.*

**T**AKE three Ounces of good Galls reduced into Powder, which infuse in three Pints of Rain, or River-Water; then set them in the Sun, or in a gentle Heat for two Days; after which add three Ounces of Coperas, and set it in the Sun for two Days more, shaking them together two or three Times a Day. Lastly, put in an Ounce of Gum Arabic.

*To make SHINING INK.*

Take of Gum Arabic and Roman Vitriol, of each an Ounce; of Galls well bruised a Pound; put them into five Quarts of four small Beer, set them in a warm Place, and shake them often. Pour off the clear, and then add an half an Ounce of Ivory Black in fine Powder, and a Quarter of a Pint of fine stale Beer.

*To make London INK POWDER.*

Take of clear Nut Galls ten Ounces; two Ounces of white Coperas; four Ounces of Roman Vitriol; one Ounce of Gum Arabic. Powder them very fine and sift them. An Ounce of this Powder put into Water will make good Ink. It is very proper to carry to Sea.

*To make RED INK.*

Take half a Pound of quick Lime and two Quarts of Water, mix them together, and let them stand a Day and Night, then pour off the clear Water, and put a Pound of Brasil Shavings into it, boil it half away, or till upon trial the Red Liquor is strong enough to write with. This done, put in two Ounces of Gum Arabic, and one Ounce of Allum; when these are dissolved, strain off the Ink and keep it for Use.

*Another Way to make RED INK.*

Take a Pint of stale Beer, two Ounces of Shavings of Brasil Wood, half a quarter of an Ounce of Cochineal, two Ounces of Roch Allum, boil them together, pour off the clear, and then add an Ounce of Gum Arabic.

*To write LETTERS of SECRECY.*

Write a Letter with the Juice of Onions, and let the Person who is to read it, hold the Paper near the Fire till the Writing appears of a redish Colour, and the Letter may be easily read.

*An excellent CEMENT for broken CHINA and GLASSES.*

Beat Garlick in a Stone Mortar and squeeze out the Juice to which add the White of an Egg, beat them together and apply it to the Pieces which are to be joined together then fix them carefully in their proper Places, and the Seams will be scarce visible.

*Another common CEMENT.*

Beat the White of an Egg very clear, and mix it with Lime in very fine Powder, join the broken Pieces together with this, and let them stand till they are quite dry.

*Another strong CEMENT for broken China Ware.*

Take equal Parts of Isinglass, Mastic, and Turpentine beat them together in a Stone Mortar till they are well united, and then join the Pieces together therewith. They will sooner break in a new than in the old Place. If the Turpentine is not enough to render the other Ingredients of a proper Consistence, add more till it is.

*To join BROKEN AMBER.*

Anoint the Pieces with Linseed Oil, and hold them close to the Fire as you can till they stick, and then let them by to dry at leisure.

*A certain Method to whiten IVORY.*

When Ivory is turned yellow or red with long keeping boil it in strong Lime-Water, suppose a Pound of Lime and a Quart of Water, and if that has not the desired Effect add more Lime. This Method never fails to bring it to proper Whiteness.

*To make the very best Kind of VARNISH.*

Take of the Bits of Amber, reduced into a Powder, a Pound, and melt it in a Crucible over the Fire. Then done pour it on an Iron Plate, and when it is cold powder it again, and mix it with drying Oil, and return it back into the Crucible, then add Spirit of Turpentine enough



enough to dissolve the whole, and keep it fluid. With this you may varnish Wood, Metals, or Prints, and nothing will hurt them. This has been a Secret hitherto.

*A VARNISH for all Sorts of Colours.*

Take of Gum Anime an Ounce, of Mastic and Gum Sandarac, of each two Ounces. Reduce them into fine Powder. Put them into a Glass Vessel, and pour a Pint of Spirit of Wine over them. Hang it in the Sun, or set it by the Fire till the Ingredients are dissolved, then filter the Liquor through a clean Cloth, and keep it in a Vial well corked. When you would use it, mix the dry Colour with some of it, and apply it to your Work.

*To make LAC-VARNISH.*

Take of clean Gum-Lac, in fine Powder, a Quarter of a Pound, put it into a Glass Bottle, and then pour a Pint of rectified Spirit of Wine over it, and let them stand two Days, shaking them often; on the third set it near the Fire till the Gum is dissolved; then strain it through a Hair Bag and put it up for Use.

*To make a LACKER that looks like Gold.*

Take of Gum-Lac in Grains eight Ounces; of clear Gum-Sandarac two Ounces; Dragon's Blood and black Clove, of each an Ounce and half. Beat them to Powder and put them in a Glass Vessel. Pour a Quart of rectified Spirit of Wine over them, and place the Vessel in a very gentle Sand-Heat till most of the Ingredients are dissolved, and when it is cold strain it through a Cloth. This is to be laid upon Tin or Picture Frames, and other Things that have been silver'd three or four Times, and they will appear to be gilded.

*To make FULMINATING POWDER.*

Take three Parts of Salt-Petre, two Parts of Salt of Tartar and one Part of Brimstone; mix them together and reduce them into fine Powder; take half a Quarter of an Ounce of this Mixture, and put in an Alchymy Spoon, or any other that will not melt, and hold over the Fire or a Candle, and it will make a Report like a Cannon.

*To make a STONE that will produce FIRE when wetted.*

Take Quick Lime, Salt Petre, Alexandrian Tutty, and the Herb called Calamint, of each equal Quantities; Sulphur vivum and Camphire, of each twice as much as one of the rest. Powder them and pass them through a fine Sieve, put them into a Bit of new Linen Cloth and tie them close up; put them into a Crucible, and place another thereon Mouth to Mouth, lute them well together and set them in the Sun to dry, and when the Powder is dry enough it will look yellow; then put the Crucible into Potter's Furnace, and it will be turned into a Kind of Brick. When you are desirous of lighting a Candle with it, moisten a Bit of it with your Spittle, and it will instantly flame. When you have used it blow it out again.

*To make a PHILOSOPHICAL TREE.*

Take of the finest Leaf Silver one Ounce; Aqua-Fortis and Quicksilver, of each four Ounces. Dissolve the Silver and Quicksilver in this Aqua-Fortis, and put the Solution in a large Glass Vial, then pour a Pint of Water over it and stop it up, and then you will soon see a fine Metallic Tree growing larger every Day.

*To make OIL-CLOTH for Hat-Cases and other Uses.*

Take drying Oil and set it over the Fire, and then dissolve Rosin in it, or which is better but dearer, Gum L. There must be so much of either as will bring the Oil to the Consistence of Balsam. Then add some Colour to it as Verdegrease for a Green, Umber for a Hair Colour, White Lead and Lamp Black for a Gray, or Indigo for white for a Light Blue. Spread this over Canvas or Linen Cloth so that it may be fully drenched or glazed over with a Brush, and when it is quite dry, no Wet can touch it. That made with Lac and applied to fine Linen, will make good Great Coats for those that travel much in all Weathers. Some have lately laid this Composition upon Silk. These fine Sorts may be rolled up and put in a Pocket, being exceeding proper for Gentlemen or any to ride out with good Cloaths, and would not have them spoiled. Some of this Varnish should be laid on the Seam after the Garment is made, and then no Wet can pass through.

*To make fine hard red SEALING-WAX.*

Take of Gum-Lac, or Shell-Lac half a Pound, melt it in an earthen Vessel, and then add an Ounce and half or two Ounces of Vermilion in very fine Powder; when they are well mixed over the Fire, and are become of a proper Coolness, make them into Sticks or Balls. If you would have a coarser Sort, take half Lac and half Rosin. If a coarser still, take Red-Lead instead of Vermilion.

*To make BLACK-WAX.*

Use the same Lac in the Manner directed above, only instead of Vermilion, mix it with Ivory-Black.

*To make BALLS to take SPOTS out of Linen, Silk, or Woollen.*

Take an Ounce of Fullers-Earth, break it in a Stone Mortar, and then drop twenty Drops of Spirit of Turpentine, and twenty Drops of Spirit of Wine among it. Rub them together and make a Ball. Some use Pipe-Makers Clay instead of Fullers-Earth.

*The Method of quicksilvering GLASS GLOBES like Looking Glasses.*

Take of Quicksilver two Ounces; of Bismuth one Ounce; Lead and Block-Tin, of each half an Ounce. Melt the Lead and Tin together, and then put in the Bismuth, and when that is melted let it stand till the Mixture is almost cold, then add the Quicksilver.

Take care that the Inside of the Glass Globe be very clean, and with a Paper Funnel pour in the Mixture very gently, and then move it about that the Mixture may touch every Part; if it does not lie on equally, warm it over the Fire, and then it will flow freely. If the Amalgama or Mixture is too thin, put in a little more Lead, Tin, and Bismuth. The finer and clearer the Globe is the better the Looking-Glass will be.

*To make STRAPS for setting RAZORS.*

Take a long Piece of Leather, about two Inches broad, that is smooth and clear on the Flesh Side; glue it to a thin Piece of Board of the same Length and Breadth; when it is dry smear it over with a Tallow Candle, and hold it over the Fire till the Grease is soaked into the Leather:

Repeat

Repeat this three Times, and then strew on some Tripoli that is clean washed, and work it into the Leather till the Grease becomes warm, and repeat the same Operation three or four Times, and then the Leather will be fit for Use. Likewise glue some Leather and Tallow on the other Side and work in some fine powdered Emery, with a Piece of smooth Ivory or a Burnisher. This Strap is extremely useful to give a Razor a fine Edge.

#### To DUTCHIFY QUILLS.

This is a Method made use of to take the Oil out of Quills, that they may hold Ink the better; it also renders them more hard. Fasten a hard Piece of Leather on your Knee, or a thin smooth Iron Plate; then make a small clear Fire, and make it hollow between the Bars of the Grate, in such a Manner that a Quill may be put in it without touching the live Coals; put the Barrel of the Quill into this hollow Place for a Second or two, taking care the Fire does no hurt; then lay it on the Iron Plate and with the Back of a Knife press it hard at the Part near the Feather; at the same Time, with the other Hand, draw the Quill hastily back, and it is done. The Quill will now turn instantly to its own Shape again.

#### To clarify QUILLS.

Put an Iron Pot over the Fire half full of fine Sand, and when the Sand is hot, stir it well about that the Heat may be equal; then put in a Bundle of Quills, and take them out from Time to Time to see when they are sufficiently transparent, and then they are enough. This Method is as proper to take the Oil out as the former, but when the Quills are not so beautiful. These are the Methods made use of by the Pentcutters in London, who work for the Stationers.

#### LIME-WATER for the STONE.

Take a Pound of Lime made with Oyster Shells, put it in an earthen Vessel, and pour a Gallon of Water upon it, let them stand four Hours, and then pour off the clear. This drank to the Quantity of three Pints in a Day, beginning in the Morning fasting, is an excellent Medicine for the Stone in the Bladder. It must be continued a considerable Time, or till it breaks and comes away by Urine. It is likewise a good Medicine in the King's Evil, the Diabetes and the Scurvy.

## *Useful Receipts.*

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### *A good EYE-WATER.*

Take of white Vitriol a Quarter of an Ounce, of Spring Water a Quart, and boil them together, till the Vitriol is dissolved. This is good for watry Eyes, for Eyes that are glued together in the Night Time, and for slight Inflammations.

### *To make TAR-WATER.*

Take of Tar two Pounds, of Spring Water a Gallon, put them into a glazed earthen Vessel, stirring them well together with a Stick; let them stand two Days, and then pour off the Water. This drank warm and often, is excellent to cure Fevers, Agues, the Small-pox and Measles, also in the Scurvy, Jaundice, Rheumatism, and Gout, in which last Cases, it must be drank to three Pints a Day. A Quart a Day drank for a few Months will cure the King's Evil. It is good in a Pleurisy, Ulcers of the Kidneys and Bladder, as well as the Dropsy.

### *BALSAM for the RHEUMATISM.*

Take a Pound of Gum Guaiac, a Spoonful of the Balsam of Peru, and a Quart and half a Pint of rectified Spirit of Wine; when the Gum is dissolved strain off the Balsam. This is a serviceable Medicine in the Rheumatism, Scurvy, Jaundice, sleepy Diseases, and Gleets. The Dose is from 30 Drops to 80-three Times a Day.

### *BALSAM for Coughs, Cuts, and Green-Wounds.*

Take of Balsam of Tolu an Ounce; Gum-Guaiac and Benjamin, of each three Ounces; of Storac two Ounces; of Socotrine Aloes, Myrrh and Olibanum, of each half an Ounce; of rectified Spirit of Wine two Quarts; powder the Ingredients, and put them into a Stone Bottle with the Spirits of Wine; set the Bottle near enough the Fire, or in the Sun in Summer, for six Days, and the Balsam will be ready. The Dose is from Twenty to Fifty Drops. It is good to raise the Spirits, to cure Coughs, to mend the Appetite, and is excellent in most Disorders of the Breast and Lungs; it is prevalent in the Cholic, from a cold Cause, and in common Loosenesses. Outwardly it heals Wounds, Ulcers, and rotten Gums; being applied to an aching Tooth with a Bit of Cotton, it will cure it unless the Tooth be too much decay'd.

A BAL-



*A BALSAM for the Palsy and Pains of the Limbs.*

Take of the Spirit of Rosemary a Pint; of hard Soap three Ounces; of Camphire an Ounce; dissolve the Soap in the Spirit in a gentle Heat, and then it is fit for Use. Rub the Balsam into the Part affected before the Fire.

*A DECOCTION for a LOOSENESS.*

Take three Ounces of the Shavings of Logwood, and boil them in two Quarts of Water, with a Quarter of an Ounce of Cinnamon, and then strain off the Liquor. This will cure all common Loosenesses, if a Tea-cupful be drank every two Hours.

*A REMEDY for an obstinate, violent COUGH.*

Buy an Ounce of the anisated Balsam of Sulphur at the Chemists or Apothecaries, and take seven or eight Drops three Times a Day on a Lump of Sugar.

*A REMEDY for the PILES.*

Take a Spoonful of the Flour of Brimstone in half a Pint of Milk every Morning till cured.

*A REMEDY for an AGUE.*

Take an Ounce of Jesuit's Bark, and divide it into four Parts; then take one Part in a Glass of red Wine every three Hours when the Fit is off. It must be repeated again in eight Days Time.

*TINCTURE of ALOES.*

Take of the best Aloes two Ounces, of Cinnamon a Quarter of an Ounce, of common Gin nine Quarters; powder the Ingredients, and mix them with the Gin, and let them stand together some Days. This is full as good as the Tinctura sacra of the Shops. The Dose is an Ounce. This is a good Purge in low Constitutions, and is good in the Green-Sickness, Scurvy, the Hippo, and for those that drink hard.

*The Cordial PURGING-ELIXIR.*

Take of Sassa two Ounces; Jalap, sweet Fennel Seed, Juniper Berries, the Shavings of Lignum Vitæ, of each an Ounce; of Molasses Spirit, or Brandy, three Pints; set the Bottle before the Fire for four Days. The Dose is a Spoonful over Night, and two or three the next Morning. The Use of it is known all over the Kingdom, having the Properties of Daffy's Elixir.

DRO

## Of Artificial Fire-Works.

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### DROPS for the STOMACH.

Take of Gentian Root an Ounce; of the Outside of Seville Orange Peel an Ounce and a half; Cinnamon and Clove, of each a Quarter of an Ounce; of French Brandy a Quart; steep them for two Days and pour off the Tincture. The Dose is a Tea-spoonful or two in a Glass of Wine before Dinner. It is a good Bitter and very useful in a Loss of Appetite and Want of Digestion.

### A PLAISTER to cure CORNS.

Take four Ounces of Gum-Ammoniac, of Quicksilver an Ounce; kill the Quicksilver by grinding it with a little Turpentine in a Stone or Glass Mortar; then melt the Gum-Ammoniac, and stir in the Quicksilver a little before it cools. This is excellent also to lay on hard Swellings to disperse them.

### PURGING SALT.

This is nothing but Epsom Salt, of which half an Ounce in an Ounce is a Dose, dissolved in a Tea-cupful of Water. It is a very cheap, safe, and easy Purge. It works without Gripes or Sickness, and is much better than Glauber's salt.

### MEAD'S POWDER for the Bite of a MAD DOG.

Take of ash-coloured ground Liver-wort two Ounces; of Black Pepper an Ounce; make them into a Powder: take away 10 Ounces of Blood from the Patient directly, and give a Dram and a half of this Powder every Morning fasting for four Days, in half a Pint of warm Milk. After this he must be dipt in cold Water for 30 Days together before Breakfast. He must first be dipped all over, and continue with Head above Water no longer than half a Minute if it be very cold.



## Of ARTIFICIAL FIRE-WORKS.

THE artificial Fire-works most in use are ROCKETS, which consist of a Cylindrical Case of Paper filled with combustible Ingredients, which being tied to a Stick and sent in the Air to a considerable Height, and there burst. This Kind is commonly call a Sky-Rocket.

The

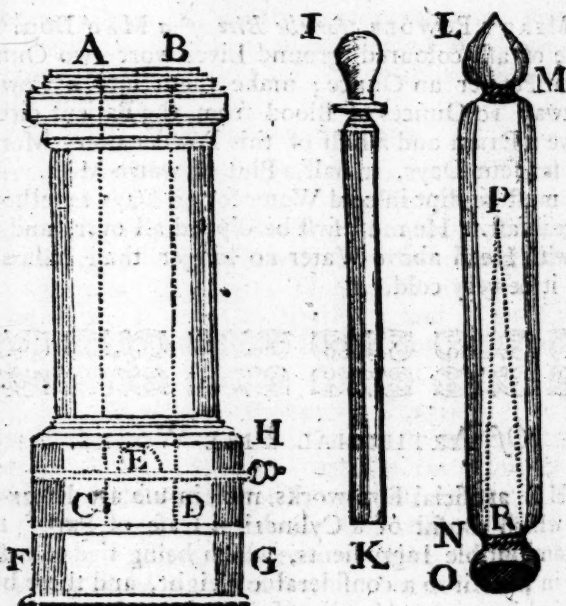
The Cases to make Rockets in are generally made of hard Wood that will not split, which must be made several Sizes, according to the Bigness you intend the Rocket should be of. Some that are very curious have them made of Brass, and small ones may be made of Ivory. It must be round, and may be quite plain; but some have them ornamented with Mouldings. This may be easily done if they are small enough to be turned in a Lathe.

This Piece of Wood must have a hollow Cylinder bored in it, as you may see in the Figure.

The Diameter of the Bore AB is the Measure of the Mould. Some say the Height of the Bore, or hollow Cylinder, should be seven Diameters; others six, and the great ones should be five, and the very great four.

Those are said to be small ones, whose inward Diameter will not receive more than a leaden Ball of a Pound Weight.

Besides the Mould there must be a Quadra or Foot of the same Materials, which must have a short, solid Cylinder in the Middle to fit the Mould, and on the Top it must be turned an Hemisphere, or half a Ball. The

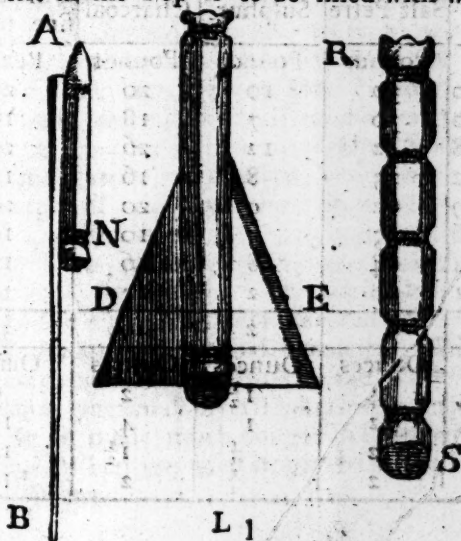


linder must be of the Height of one Diameter of the  
 re. The Hemisphere, which is at the Top of the afore-  
 solid Cylinder, must be considerably less than the Di-  
 meter of the Bore. In this Figure A B C D is the Bore  
 hollow Cylinder, E is the Hemisphere, F G is the Foot,  
 H is the Handle of a Screw which serves to keep the  
 hemisphere steady.

There must be likewise a wooden Cylinder, I K, to roll  
 Paper upon, whose Diameter must be two Thirds of  
 Diameter of the Bore, and of the same Length. Thick  
 Paper must be rolled very smooth and even, till it  
 is large enough to fill the hollow Cylinder or Bore. This  
 Paper, where the Half is joined to the Cylinder, it is to be  
 bound that is, bound firmly round with Packthread or  
 Cord, so as to constringe or lessen the Cavity there-  
 in. The Part thus choked or bound up, as at N, is to be  
 equal to the Hemisphere E.

The Case is now to be taken off the Mould, and put in-  
 to the Cavity of the Frame, and the Choke O must be put  
 in the Hemisphere, and then it must be filled with a  
 Composition hereafter described, which must be rammed  
 evenly in with a Rammer and Mallet.

When the Rocket is filled, a Paper Cap, of a tapering,  
 conical Form, is to be glued over the End, as at L, and  
 the Space left at the Top is to be filled with whole Gun-



powder,

powder, to the Height of about one Diameter, and then the Rocket is to be bound or choked at M, as before at N.

Lastly, the Rocket is to be bored, as is represented by the prick'd Lines P R, just in the Middle by thrusting a long sharp Spike up the lower Basis, and drawing it out again. It is best done a little before it is used, and should be almost two Thirds of the Length. There must be a Touch-hole at N to set it on Fire.

To make it mount straight up, it must be tied fast to a long slender Stick, marked A B in the foregoing Figure eight Times as long as the Rocket, and in such a Manner that when you press it with your Finger near the Touch-hole N, the Stick, which is sloping, and thickest at the upper End, may preponderate a little; then it is to be put at Freedom, and set on Fire. Some instead of the Stick make it with two Wings, as D E; and some again instead of Paper use a wooden Case, cover'd with Leather; and others again instead of a Stick use an Iron Wire with a Plummet at the End.

The Composition that is made use of to fill Rockets consists of Salt-Petre, Sulphur, and Charcoal, all ground to very fine Powder; but the Proportions are various in Rockets of various Sizes. The following Table will shew the several Proportions at one View.

| Weight of Rockets | Salt Petre | Sulphur        | Charcoal       | Gunpowder fine powd. |
|-------------------|------------|----------------|----------------|----------------------|
| Pounds            | Pounds     | Pounds         | Pounds         | Pounds               |
| 100 or 60         | 30         | 10             | 20             | 20                   |
| 50 30             | 30         | 7              | 18             | 18                   |
| 20 18             | 42         | 12             | 26             | 26                   |
| 15 12             | 23         | 8              | 16             | 16                   |
| 10 9              | 62         | 9              | 20             | 20                   |
| 9 6               | 35         | 5              | 10             | 10                   |
| 5 4               | 64         | 8              | 16             | 16                   |
| 3 2               | 60         | 2              | 15             | 15                   |
| 1                 | 6          | 2              | 6              | 32                   |
| Ounces            | Ounces     | Ounces         | Ounces         | Ounces               |
| 9                 | 4          | $1\frac{1}{2}$ | 2              | 9                    |
| 6                 | 12         | 1              | 4              | 15                   |
| 3                 | 2          | $\frac{1}{2}$  | $1\frac{1}{2}$ | 12                   |
| 1                 | 2          | $\frac{1}{2}$  | 2              | 15                   |



## *Of Artificial Fire-Works.* 387

Rockets are now seldom made without Stars, which make a very beautiful Appearance, or with Serpents or Sparks, which take Fire when the Rocket bursts. Sometimes little Rockets are inclosed in great ones, which do not take Fire till they are a great Height.

### *To make STARS for ROCKETS.*

Mix three Pounds of Salt Petre with 11 Ounces of Sulphur, three Ounces of Gunpowder, and ten Ounces of crude Antimony, all in fine Powder; moisten the Mass with Gum Water, and form them into little Balls of the Size of Filberts; dry them well. When dry inclose a Number of them in the conical Cap of the Rocket.

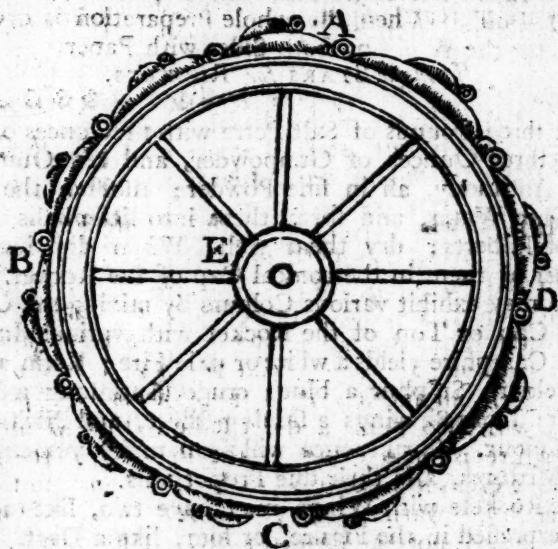
You may exhibit various Colours by mixing the Charge in the Cap or Top of the Rocket with various Ingredients. Camphire yields a white or pale Fire; Rosin a Copper Colour; Sulphur a blue; crude Antimony a Honey Colour; Ivory Shavings a shining Silver, and Pitch a deep dark Colour. But Practice will soon make you expert in these Mixtures, and their due Proportions.

The Rockets with Wings may have two, like an Arrow, expressed in the Figure, or four, like a Dart. They may be made of Paste-board, and glued crossways to the Dart. These Sorts of Rockets are fixed upon a Stand, being placed between four Sticks set upright on the Stand.

Some fire the Matches with Meal Powder, that is, Gunpowder Dust, or ground small, and others with a Match.

WATER ROCKETS differ in nothing from Sky Rockets, but in the Number of Chokes, which are commonly five, an Example of which you have in the Figure R S. The Diameter of the Bore must be about two or three Inches, and it must be hollowed by a sharp Spike, like the other, two thirds of its Length. This done, it must be inclosed in a hollow Paper Cylinder smeared with Wax or Pitch, that the Water may not soak through. This Rocket must be so contrived that it may sink in the Water; for this Purpose, some put small Iron Flakes with the Charge at the End. It is made much longer in Proportion than other Rockets. When it is used it may be set on Fire, and flung into the Water.

FIRE-WHEELS are of three Sorts, single, double, and triple. They are generally of a circular Form, as under, but they may be made with Angles, as a Hexagon, Pentagon, Octagon, Decagon, and the like. The Wheel

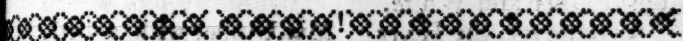


turned upon an Iron Pin or Bolt, drove or screwed into a Post. The Nave E is to be turned of close or firm Wood into which the Spokes are to be fastened, of the same Number as the Fells. These must have a Groove hollow round, so deep as to contain one half of the Rocket.

The double Wheels must have stronger and wider Fells with a Groove for the Rockets on the Top and one of Sides. A triple Wheel has a Groove at the Top, and on each Side, and the Matches must be laid from one Groove and Rocket to another, with small Pipes filled with Meal Powder, and after they are fixed you are to cover them with Paper glued over them.

The Rockets being prepared you must cut back the Fell a little shelving, and bore them; the first, three Diameters of its Orifice; the second a little less, and so less and less by Degrees till you come to the last. After this they are to be primed with Meal Powder worked up with Brandy, and glued into the Groove. The Head of the Rocket must be lifted up higher than the rest, as also

of the last, in which must be a Report. You may also glue small Rockets to the Back of each Rocket, towards the End, as you see in the Figure, and a Communication must be made between the Rocket and the Report, by Means of a small Quill. When the whole Preparation is dry, you may cover the Wheel on both Sides with Paper.



*Of Painting MEZZOTINTO PRINTS with OIL-COLOURS.*

**T**HE Method of colouring Mezzotinto Prints, is first to paste them properly to a Piece of Glas of the same size, to take off the greatest Part of the Paper, and then to paint with proper Colours. Now to do this, you must first lay the Print in fair Water for two Days and two Nights, or longer, if your Print be on very strong Paper. Then take it out and lay it on two Sheets of Paper, and cover it with two more, and let it lie in that Manner till the Moisture is sucked out of the Print. In the meantime, the Glas the Print is to be laid upon must be set near the Fire to warm; then put some Strasburgh Turpentine into a Gallipot, and warm it on the Fire, which done, read it over the Glas with a Hair-Brush very smooth; then take the Print from between the Sheets of Paper, and lay it on the Glas, beginning at the Top, and so rub it gently down as you go on till it lies close, and there be no Wind-Bladder between the Print and the Glas; this being finished, roll off the Paper with your Fingers till you see nothing but the Print left on the Glas; then set it to dry, and when it is dry, varnish it over with a transparent Varnish, and then it will be fit for Painting. The Oil-Colours that you make Use of must be ground very fine, and pretty stiff; with these first go over the outer-Lines of the Print with proper Colours, and then use that should appear most forward. When you come to have a compleat Skill in this Method, the Print will look as well as a Painting. But as the Reader may be supposed to be quite ignorant of the proper Colours, I shall give some Directions about them, and then Time and Practice will bring this Art to Perfection.

**Colours for FACES.** Fair Faces may be coloured with White, a little Vermilion, and a very small Matter-Lake; for the Lips add more Vermilion and Lake; for brown Face take white and burnt Oker, if muddling, add a little Vermilion with the former; if the Face is designed to represent a Tawnymoor, take Cullen's Earth with a little burnt Oker and White.

**Colours for the HAIR.** Mix Umber with a little Black and White for brown Hair, Stone-Oker, White-Lead and a little Vermilion for sandy Hair; White Lead, a little Stone-Oker, and a little Cullen's Earth for flaxen Hair.

**LINEN** is painted with White-lead, mixed with a very little Blue.

**SILVER** is coloured with White, a little Smalt, and for white Masticot.

**GOLD** is imitated with red Orpiment, and white Masticot, in equal Parts.

**Colours for GARMENTS.** For Blue, take Smalt ground very fine and White-lead; for a Grass-green, mix Verdigrase and a little yellow Pink; for a Willow-green, mix Verdigrase with a very little White; for a Sea-green, mix green Verditer, yellow Pink, and white Lead; a Carnation is made by mixing Lake and white Lead; a Crimson, Vermilion, Lake and White; a Scarlet, by Vermilion alone; a Cherry-colour, by Vermilion and white Lead; a Yellow done by Orpiment or yellow Masticot, if pale mix White with either; an Orange is made with Orpiment and Vermilion; a Purple, with Smalt, Lake and White; a Violet with Bice and Lake; an Ash-colour, with Black and White; a Chesnut, with Umber, Lake and White; for a Dove-colour, take White, a little Lake and a little Smalt;

**Colours for TREES.** For the Bodies of Trees take yellow Pink, white Lead, yellow Oker, and a little Black; for the Leaves, take Verdigrase and Pink; for a dark Colour, take Indigo and Pink; for the distant Leaves take green Verditer, yellow Pink and white Lead.

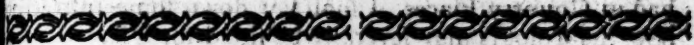
**Colours for the Ground of a Picture.** When they are for a Portrait, light Hair requires a dark Ground, that is, Umber, White and Black; and dark Hair a light Ground, namely, Umber and White.

**Colours for a LANDSKIP.** For the Ground take Pink Oker and White, with a little green Verditer; for Country

Hou

Houses at a Distance, take white Lead, yellow Oker and Smalt; as also for Stone-Houses; for the Walls of Brick-Houses at a Distance, take yellow Oker burnt and white Lead; when near, India Red and a little White.

SKY-COLOURS are made of Smalt and White; those a little lower should have more White; and those lowest of all, Yellow and Vermilion.



*Of Painting WINDOW-BLINDS.*

THERE is a thin Kind of Cloth which will serve best for this Purpose, and may be had at the Linen-Draper's. It must be first wet with clean Water and then strained tight to the Frames, and when quite dry varnish it with the following Varnish. "Take a Pint of good clear Nut Oil, put it in an earthen Pipkin, and then add half a Pound of Litharge in fine Powder; set it on a slow Fire, and keep it hot for twelve Hours, but it must not boil, stirring it often; then pour off the Oil and put a Pound and a half of the clearest white Rosin therein, and dissolve it in the Oil over a slow Fire, keeping it stirring till it is done; then put in a Pound of Venice Turpentine and stir them well together." Let the Blinds be varnished over with this Mixture, so as to make them look clear and transparent all over.

When the Varnish is dry, the Blind may be painted with what Figure you like best, though Landskips are most agreeable. Colours that have a fine Body are most proper for this Purpose, because they will best transmit the Light.

Lake in this Case, is very suitable for making a Ruddy, Red, and distilled Verdigrease serves for a transparent Green. Orpiment yields a Gold Colour, and burnt Umber, as well as yellow Oker, will do well enough when thinly mixed with Oil.

The Varnish above described is of very great Use for Paper Windows, because it renders them transparent and lasting. For those that have weak Eyes it may be mixed with distilled Verdigrease, and then the Paper will become of a fine green Colour, very grateful to the Eyes.





*Of Colouring PRINTS, MAPS, PLOTS and CHARTS.*

**P**RINTS, Maps, and Plots of Fields, are stained with Water Colours, which in London may be had ready prepared and put into Shells; but as these are seldom to be had in Country Places, I shall lay down some Instructions how the Colours may severally be fitted for Use,

The Principal are white Lead, Flake-White, yellow and red Oker or Ochre, Umber raw and burnt, Orpiment, Lamp-black, Ivory black, Vermilion, Gamboge, Lake, Verdigrease, blue and green Verditer, Bice, Bistre, Small Ultramarine, Carmine, Sap-green, yellow Berries, Brazil wood, Cochineal, Logwood, and Spanish Brown.

Before a Map, Print, &c. is fit for colouring, it should be done over with Allum dissolved in Water, by Means of a large Brush, such as Painters use. But sometimes the Paper is of such a Texture that the Colour will sink in, and then it is impossible to do any Thing neat without preventing this Fault. Some, for this Purpose, smear the Paper over with thin Starch, and let it dry on; but the best Method is to boil Bits of white Leather in fair Water till it is dissolved, and become a thin Size; when the Paper is covered slightly all over with this, and quite dry, it will never deceive your Expectation.

Most of the Colours above-mentioned ground with Water alone would be apt to rub off and so spoil, and therefore will be necessary to temper them with Gum-Water, which is made by dissolving three Ounces of Gum-Arabic in a Pint of soft Water, which must be kept in a Bottle for Use.

Allum-Water is made by dissolving a Quarter of a Pound of Allum in a Quart of Spring-Water over the Fire, and when it is cold it must be put up into a Bottle. It serves to give a Lustre and Beauty to the Colours which are laid on the Paper.

Besides these, you must be furnished with a Piece of Marble or other Stone, and a Muller to grind your Colours with, as well as Pencils of several Sizes, Gally-pots, and Horse-Muscle-Shells to put your Colours in when ground and tempered.

To grind a Colour. Take any Quantity of the Colour you think convenient, and lay it on a clean Grinding Stone, then break it small with your Muller, and add a little Water; grind it very fine, and put it into the Shells with a thin Knife. The stiffer they are ground, the better. The Colours to be ground are white Lead, Lake, Indigo, Vermilion, and all earthy Colours.

To wash Colours. Take the Colour and put it into a Basen with fair Water, then stir them well together, and a foul Scum will rise to the Top, which must be taken off; then pour the Water into another Basen, as gently as you can, and pour fresh Water to the remaining Colour; stir them together, and pour off the Water; do this as often as the Colour will render the Water turbid; then the Water poured out must settle, and a fine Colour will remain at the Bottom. Some Colours, when treated in this Manner, will send off nothing but Filth, and the pure Colour will remain at the Bottom of the first Vessel. This Difference between the Colours will appear at the first Sight. The Colours to be washed are red Lead, Bice, Verditer, Spanish Brown and Orpiment. Note, True Orpiment is a fine yellow Colour, with the Appearance of Gold Flakes, and is best ground. As for yellow Arsenic, which is a strong Poison, and commonly sold for Orpiment; the best Way is not to use it at all.

Some Colours are to be steeped or dissolved in Water, such as yellow Berries, Gamboge, Saffron, and Sap-Green. Note, The best Way of using Gamboge is to take a Lump, and make a Hole at the Top, putting in a little Water, and then, with a Pencil, take off the Colour as you use it.

Some are to be boiled, as French Verdigrease, Brasil, Logwood and Wood-foot.

To temper Colours. Put a little Gum-Water into the Shell to your Colour, and stir it about with a clean Finger till it is dissolved.

RED COLOURS, are Carmine, which should be tempered with weak Gum-Water, it makes the finest Red; Vermilion which is a bright Scarlet; Lake is a deep Pink; Red-Leaf is an Orange; Brazil boiled in stale Small-Beer with a little Allum makes a good Red for staining Maps.

YELLOWS. Gamboge is a good Yellow, the Manner of using it has been shewn above; Yellow-Berries steeped in Water

Water with a little Allum make a bright Yellow to colour Maps; Orpiment makes a fine Gold-Colour; Saffron steeped in Water makes a fine Gold-Colour, but it soon decays.

**BLUES.** Ultramarine is a very dear Colour, but makes a charming Blue; Bice is a very good Blue, but is not transparent; Indigo is a very deep Blue, and proper for dark Shades; Blue Verditer.

**PURPLE.** Logwood boiled in the Manner of Brazil makes a very deep Purple.

**GREENS.** Sap Green dissolved in Water with a little Powder of Allum makes a deep Green; Green Verditer is a tolerable Green, but not transparent.

**BLACKS.** Indian Ink tempered with Gum-Water makes the best Black; Lamp-black, Printer's Black, Ivory-black.

**WHITES.** White-Lead and Flake-Whites. Note, All Whites made with Lead will turn black in Time, and therefore it will be best to use the white Part of Oyster shells ground very fine in their Room.

**BROWNS.** Spanish Brown burnt makes a redish Brown or Liver-Colour; Umber burnt is a Haw-Colour, and proper to shadow Gold; Wood Soot is a good Colour for Highways, Lanes, &c.

To make liquid **VERDIGREASE.** Take two Ounces of good Verdigrease, and Half an Ounce of Cream of Tartar, and of Gum Arabic the Quantity of an Hulse Nut beat them together to Powder, and boil them together in a Quarter of a Pint of Water till they are dissolved; strain the Mixture through a fine Rag, and keep it in a Bottle for Use. It is of a fine blue-green Colour.

To make **BISTRE.** Take clean bright Wood-foot, and set it over a slow Fire with Water till it is dissolved; then strain it through a fine Rag, and keep it for Use. If you would have it in a solid Form, evaporate the Water.

To choose **PENCILS.** When you buy Pencils see that they are full, and that they gradually lessen to a Point which you may tell by putting the Pencil in your Mouth and drawing it through your Lips once or twice, and then you will see its true Shape. When they do not end even, or when they are ragged at the Point, they are not good.

When you make use of a Pencil, and have laid on one Colour, before you lay on another cleanse it well in a Dish of Water, which must always stand by you while you are at work.

To colour PRINTS. When these are Mezzotinto Portraits, the best way will be to get a good Picture of a Man or Woman that is well painted, and as near as you can imitate the Colours laid on different Parts of the Face, Hands and Drapery, till you can proceed without a Guide. Prints of Landskips, Views of Towns, and the like, should be first attempted by good Patterns laid before you done by a good Hand; but if these are not to be had, take a good painted Picture, the likest the Print you can get, and observe how the Sky, Clouds, Hills, Houses, Fields, Trees, Glass, Ground, Cattle, Sheep and other Things are coloured therein, which, if well copied, will soon bring you to give every Part its proper Tint, remembering always to represent the Light and Shades; for this will give Life and Beauty to the whole Performance.

To colour the PLOT laid down from a Survey. In this Case, suppose you were to inclose a Field with Yellow, make Use of Gamboge, and lay on the Colour of an equal Breadth within the Line made with a black Lead Pencil: Having gone quite round the Field, wet your Pencil a little, and soften the Inside of your coloured Line by making it gradually thinner next the Center of the Field; by this Means the Colour will change insensibly to that of the Paper or Parchment, which will have a very good Effect. Then with a Pen dipped in the same Colour cover the black Lead Line that nothing of it may appear; every Field in the same Plot should be done with a different Colour, taking Care not to do any two adjoining Fields with the same Colour.

To colour MAPS. What has been said about colouring of Plots may safely be applied to the colouring of Maps, only instead of a black Line there are Lines of Dots or Points, which divide one Country from another. Follow these as a Guide, and lay on the Colour as above directed. In general Maps, as of Europe, for Instance, France must be done with one Colour, Italy with another, &c. In Maps of England, Essex must be bounded with one Colour, Middlesex with another, Surry with another, Hertfordshire with another, &c. It is common to stain the whole Map with different Colours, and then the Bounds or Edge of each Country or County must be somewhat more strong coloured than the Middle, taking Care that this last be quite transparent, that every Letter may be plainly seen through

through the Colour. County Maps are divided into Hundreds, which are to be distinguished by different Colours, in the same Manner as whole Countries.



*Of Colouring in OIL, and Painting of Timber-Work.*

**T**HE Colours that are made to colour Timber, or any Thing that is exposed to the Weather, must have a Body, and therefore many Colours are to be rejected which were useful on other Occasions. And therefore to prevent Mistakes, I shall enumerate the Colours that are proper for this Purpose.

The Whites are white Lead and Cerus, which last is only more clear and pure than the former: These may be worked with much Ease, and will grind as fine as the Oil itself; for in-door Work grind it with Nut-Oil, and for Work without Doors with Linseed Oil, because Nut-Oil will not be so apt to turn yellow.

The most common Black is Lamp-Black, which should be mix'd up with drying Oil, otherwise it will continue wet a long Time, because it is greasy. But this may, in some Measure, be remedied by heating a Shovel red hot, and laying it thereon till it has done smoaking. Ivory-Black may be had at the Colour Shops, ready prepared. It will grind well with Oil, and will lie on your Work with a good Body.

Vermilion is a beautiful Red, and may be ground with Oil very fine. It has a good Body, and will spread very freely. Some make use of Lake, which is a purplish Red, but then it must only be for in-door Work. Red Lead is a Kind of an Orange Colour, and has a good Body, binding very fast, and drying quickly. Spanish Brown is of the Colour of Horse-Flesh, and is of great use for priming any Work, being cheap and will grind fine.

Yellow Oker is of several Sorts, that is, some of a lighter and some of a deeper Yellow. It has a very good Body, and resists the Weather to Admiration. Pink Yellow has a green Cast, and is very proper for Work within-doors. Orpiment, not yellow Arsenick, is very proper for the same Use. Masticot is a light Yellow, and makes a good Green mix'd with a Blue.

Verdigrease



Verdigrease is a very useful Colour, and is of a blueish Green, and if you mix it with yellow Pink it makes a fine Grass-Green. Green Bice is gritty, as well as Green Verditer, and yet neither of them have Body enough for this Kind of Painting, but yet are very proper for Pictures.

Blue Bice is of a pale Blue, and is useful enough, but is hard to grind fine. Prussian Blue would be an excellent Colour if it would but stand, for though it looks very fine at first, it is apt to change to a dark dirty Colour. Indigo is a very dark Blue, and therefore it is usually made lighter with a Mixture of White, and then it has a faintish Appearance. However it has a good Body, and is much used in this Sort of Painting. Smalt is a charming Blue, but loses its Beauty when mix'd with Oil, and therefore it is to be strewed on the Work first painted with white Lead.

Umber is a Sort of a brown or hair Colour, and grinds very fine, bearing an excellent Body. If you put a Lump in the Fire, making it red hot, it will become darker, and at the same Time more lively.

For grinding Colours it will be necessary to have a Piece of Marble or other Stone to grind them upon, which may be had at the Colour Shops from two Shillings to a Crown a Piece. As also a Muller to grind them with. The Price is eighteen Pence, or two Shillings.

To lay on the Colours you must have Brushes, which may be had from a Penny to Six-pence a piece. For some Sort of fine Works you must have Pencils in Tin Cases, or Wood Sockets, which will cost from two Pence to eight Pence a Piece. Swan-Quill Pencils are a Penny a piece, Duck-Quills are Six-pence a Dozen one with another.

When Colours are only mixed with plain Linseed Oil, they commonly are a long while in drying, and therefore will be proper to mix them with drying Oil, which is made in the following Manner. Take a Quart of Linseed Oil, and two Ounces of Litharge in fine Powder. Mix them and set them over the Fire in an earthen Pan, and let them boil for near an Hour, or till the Oil is grown thick and fat; then take off the Pan, and when the Litharge is settled at the Bottom, pour it into a Bladder or Glass Bottle, and keep it for Use. When you mix your Colours, take three Parts of Linseed Oil and one of drying Oil.

For coarse out-side Work, that requires a great deal of Colour, it is always put into Pots, and taken from thence with a Brush at the Time of Use, and when it is set by, there should be Water poured on the Top to preserve the Colour from drying. Likewise the Colour should be washed out of the Tool or Brushes, first with Linseed Oil and then with Sope-Suds.

When you have Occasion to paint or draw any Thing with small Pencils, your Colours should be laid on a Palette by the Side of each other. In this Case likewise it will be best to buy the Colours ready prepared, which may be had at the Colour Shops at easy Rates, put up in small Bladders; and when you use them you must prick the Bladder and squeeze out as much of each Colour on the Palette as you think you shall want. This is the Method that Landscape and Portrait Painters use. By mixing the Colours thus laid, you make any Shade that will be wanted.

It will be necessary to know what Colours will arise from the Mixture of others in common Painting. Thus white Lead and Lamp-Black mix'd together make an Ash-Colour; Indigo and White make a Lead-Colour; White and Oker make the Colour of new Timber; white Lead, Vermilion and Lake make a Flesh-Colour; yellow Oker and white Lead make a Buff-Colour; Verdigrease and White make a light Willow-Green; Verdigrease and yellow Pink make a Grass-Green; Lake and White make a Carnation; yellow Oker and Red-Lead make an Orange; Red-Lead, yellow Oker and a little White make a Brick Colour; yellow Oker and White make a Straw-Colour; burnt Umber and White make a Walnut-Tree Colour, &c. Use and Experience will show you the Result of many other Mixtures.

The Design of common Painting is to preserve Wood and Iron from the Weather, in performing of which you must first look over your Work, and see if there is any open Joint or Clefts in the Wood, and if there are they must be first stopped with Putty made with Whiting and Linseed Oil, otherwise the Wood will soon be decay'd by the soaking in the Wet. Then proceed to priming the Work with Spanish Brown mix'd with Plenty of Oil, that it may the better penetrate every Part of the Work. Repeat this a second and a third Time with the same Colour of a thicker Consistency if you would have the Work durable and lasting. The

being

being dry lay over the Colour you design it to be of as thick as you can well work it, taking Care that no Part is missed. The Marbling of Chimney-Pieces, and the Painting Wainscot like Walnut-Tree or Mahogany, is best attained by observing the Method that other Painters take when they are at Work. And indeed in all other Kinds of Painting it will be a great Advantage, if you have an Opportunity of seeing all the Management from the grinding of the Colours to the laying them on, and then the Rules that I have laid down will be of a more singular Advantage in forming your Judgment.

**FORMS for BUSINESS in the MERCANTILE WAY.**

*Bills of Parcels.*

*London, June 20, 1764.*

|                                                        |            |           |
|--------------------------------------------------------|------------|-----------|
| The Honourable Mrs. Williams, Bought of Thomas Groves, |            |           |
| 20 Yards of flower'd Damask,                           | at 7s. 6d. | 7 10 0    |
| 32 Yards ditto,                                        | 8s.        | 12 16 0   |
| 10 Yards of rich Sattin,                               | 15s.       | 7 10 0    |
| 12 Yards of Paduasoy,                                  | 11s. 6d.   | 6 18 0    |
|                                                        |            | <hr/>     |
|                                                        |            | £ 34 14 0 |

*London, June 22, 1764.*

|                                                         |             |           |
|---------------------------------------------------------|-------------|-----------|
| Messrs. Wilson and Darves, Bought of Franklin and Long, |             |           |
| 6 Pieces of Dowlas,                                     | at 28s. 6d. | 8 11 0    |
| 4 Ditto,                                                | 20s. 6d.    | 5 18 0    |
| 6 Ditto,                                                | 30s. 6d.    | 9 3 0     |
| 10 Pieces of Cambrick,                                  | 35s.        | 17 10 0   |
| 6 Doz. Linen Handkerchiefs,                             | 15s. 6d.    | 4 13 0    |
|                                                         |             | <hr/>     |
|                                                         |             | £ 45 15 0 |

*Invoice from ITALY,*

Factory of the Cost and Charges of one hundred Barrels of Anchovies shipped on board the *Turtle*, Capt. *William*, for Account of Mr. *Theophilus Ducarey*, of London, Merchant, and consign'd to himself under Mark per Margin, to prime Cost of said 100 Barrels of Anchovies, at Ps.  $\frac{8}{3}$  per Bar.  $2\frac{1}{4}$

1650 0 0

## Forms for Mercantile Business.

|          |                                       |                   |       |
|----------|---------------------------------------|-------------------|-------|
| <b>T</b> | To Porterage and Warehouse,           | <i>Liv.</i> 6 0 0 |       |
|          | To Jelling, with Cooper's Pains,      | 15 0 0            |       |
|          | To Warehouse Room and Leviation,      | 25 0 0            |       |
|          | To Porterage and Boatage aboard,      | 20 0 0            |       |
|          | To Brokerage, $\frac{1}{2}$ per Cent. | 8 5 0             |       |
|          | To Primage,                           | 5 0 0             |       |
|          |                                       |                   | 79 5  |
|          | To my Provision, 3 per Cent.          |                   | 51 17 |
|          | <i>Leghorn, June 18, 1764.</i>        |                   |       |

Errors excepted.

*Joseph Lawrence.**Bills on Book Debts.*

|          |                                              |                      |       |
|----------|----------------------------------------------|----------------------|-------|
| 1764     | Mess. Dawes and Jones,                       | Dr. to James Longman |       |
| April 21 | —To 50 Yards Paduasoy, at 15 s.              |                      | 37 10 |
|          | 22 Yards $\frac{1}{2}$ Lutestring, 8 s. 6 d. |                      | 9 7   |
| May 3    | —To 40 Yards Silk Camblet, 3 s. 6 d.         |                      | 7 0   |
|          | 20 Yards Grogam,                             |                      | 3 0   |
| June 12  | —To 36 Yards Mantua, 3 s. 6 d.               |                      | 6 6   |
|          | 16 —To 24 Yards flower'd Damask, 8 s.        |                      | 9 12  |

*£ 72 15**Richard Thompson, Esq;*

|          |                                     |                         |                |
|----------|-------------------------------------|-------------------------|----------------|
| 1764     |                                     | Dr. to Philip Overbury. |                |
| March 26 | To 20 Gallons Palm Sack, at 10 s.   |                         | 10 0           |
| April 10 | To 30 ditto Red Port,               |                         | 6 s. 9 0       |
| May 6    | To 17 ditto Lisbon,                 |                         | 6 s. 8 d. 5 13 |
|          | 15 To 12 ditto Rhenish              |                         | 7 s. 4 4       |
| June 8   | To $\frac{1}{2}$ Chest of Florence, |                         | 2 5            |
| July 2   | To 3 Dozen Claret,                  |                         | 52 s. 7 16     |

|        |                                         |  |       |
|--------|-----------------------------------------|--|-------|
| 1764   |                                         |  | 38 18 |
| May 23 | By your Bill on Davis and Long received |  | 18 10 |

Balance due *£ 20 8**Various*

\*\*\*\*\*  
*Various Forms of Acquittances, upon the Receipt of Money,  
 by Masters, Servants, Agents, &c.*

Received May 13, 1764, of Mr. John Williams, nine  
 Pounds ten Shillings, for my Master William Hunt.

£9 10 0

per John Cole.

Received the 24th of June, 1764, of Henry Powel, forty-  
 five Pounds eight Shillings, in full for my Master, William  
 Savil.

£45 8 0

per James Smart.

Received the 24th of May, 1764, of the Honourable  
 East-India Company, by the Hands of William Hall, Esq;  
 two thousand Pounds, for Mr. Phipps and Company.

£2000 0 0

per Thomas Truff.

Received the 20th of August, 1764, of Mess. John and  
 James Sterling, five hundred and forty-five Pounds, on  
 Account.

per William Day.

Received the 20th of April, 1765, of Jeremiah Watson,  
 Esq; the Sum of two hundred and fifty Pounds, in full of  
 all Demands, for Self and Company.

£250 0 0

per Jonathan Scot.

Received the 20th of May, 1765, of Mr. Charles Thorne,  
 twenty-five Pounds, in full for the Difference of two thou-  
 sand five hundred Pounds, Bank Stock.

£25 0 0

per John Trier.

Received the 10th of June, 1755, of Mr. James Stone,  
 thirty six Pounds, in full for six Months Interest of thirteen  
 hundred and twenty Pounds, due at Lady-Day last.

£36 0 0

per Henry Slater.

Received the 30th of July, 1755, by the Order and for  
 the Use of Mr. Henry March, of Mr. Stephen Lovell, eight  
 Pounds ten Shillings, and allowed for Taxes and Repairs  
 one Pound ten, making together the Sum of ten Pounds, in  
 full for a Quarter's Rent, due at Michaelmas last.

£10 0 0

per Randel Stone.

Received the 2d of August, 1755, of the Executors of  
 James, late Earl of Gower, by the Hands of Mr. William  
 Gee, the Sum of seventy five Pounds, in full for my half  
 Year's Annuity, due at Lady-Day last.

£75 0 0

per Jane Shaw.



## Various Forms of Promissory Notes.

London, July 6, 1759.

I promise to pay the Honourable *Savage Parril*, Esq; or Bearer, on Demand, fifty Pounds,

£ 50

For Sir *Edward Penrith* and Partners

Edmund Stokes

I promise to pay Mr. *John Edwards*, or Bearer, on Demand, eight hundred Pounds, August 10, 1751.

£ 800

Henry Steele

I promise to pay to the Governor and Company of the Bank of England, nine thousand eighty Pounds,

For Self and Partners, June 19, 1751

Francis Fane

£ 9080

I promise to pay *Henry Petersham*, Esq; Cashire of his Majesty's Revenue of Excise, or Order, forty Days after Date, four hundred and fifty-five Pounds, Value received

£ 455

per *William Etrington*

I promise to pay Sir *Josiah Todd*, or Order, the Sum of sixty Pounds in Manner following, twenty Pounds Part thereof three Months after Date, twenty Pounds more the 25th of April next and the remaining twenty Pounds the 25th of June next following, the Value received. Witness my Hand, at London, the 25th of October, 1751.

£ 60 0 0

Edward Doughty

Stratford, June 11, 1764.

Borrowed and received of Mr. *John Friend* the Sum of one hundred and five Pounds Sterling, which I promise to pay the said *John Friend*, or Order, upon Demand:

Witness my Hand,

Abraham Needful

Witness } *James Long*,  
              } *John Stacy*.

Received of *T. F.* Esq; eight Deeds, all relating to his Estate in the Parish of *Ongar*, in *Essex*; which I promise to return the said *T. F.* or Order, undamaged, on Demand. Witness my Hand, this 24th Day of May, 1765

Peter Greaves

## Inland Bills of Exchange.

London, July 3, 1764.

S I R

£ 27 17 0

At six Days Sight pay Mr. *John Long*, or Order, twenty seven Pounds seventeen Shillings, Value received of Mr.

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*Forms for Mercantile Business.* 403

*Thomas Wilcox*, and place it to Account without further Advice from

To Mr. *Samuel Johnson*. *Your very humble Servant,*  
Linen-draper in *Worcester*, *Thomas Young*,  
*Exeter*, July 4, 1764.

Mess. *Tanter and Cooper*, £ 4350 0 0  
At twenty Days Sight pay Mr. *Richard Jones* four thousand three hundred and fifty Pounds, Value of him received, and place it to Account, as by Advice from

To Mess. *Tanter and Cooper*, *Your very humble Servant,*  
Bankers in *London*. *David Williams*,  
*London*, July 5, 1764.

S I R, £ 250 0 0  
Fifteen Days after Date pay *Samuel Lowe*, Esq; or Order, two hundred and fifty Pounds, Value received of Mr. *Jacob Wilson*, and place it to Account, as by Advice from

To Mr. *Timothy Wilkes*, *Your very humble Servant,*  
Merchant in *Lincoln*. *Jacob Lowett*,  
*Bristol*, July 4, 1764.

S I R, £ 50 3 0  
One Month after Date pay Mr. *Thomas Cape*, or Order, fifty Pounds three Shillings, Value received, and place it to Account, as per Advice from

To *Joseph Sawist*, *Your very humble Servant,*  
Merchant in *Winchester*. *Edward Deach*,

*Foreign BILLS of EXCHANGE.*

*Rotterdam*, July 22, 1764.  
Due 11 Sept. For £ 60 Sterling.

At two Usance of this my first of Exchange, pay to Mr. *Jean Pierre St. Martin*, or Order, sixty Pounds Sterling, Value of Mr. *Jean Burgher*.

Accept. J. P. *Claudius Venbagen*,  
To Mr. *Richard Longman*, Merchant in *London*,  
*Rotterdam*, July 22, N. S. 1764.  
For £ 60 Sterling.

At two Usance of this my second of Exchange, (the first not paid) pay to Mr. *Jean Pierre St. Martin* or Order, sixty Pounds Sterling, Value of Mr. *Jean Burgher*.

To Mr. *Richard Longman*, *Claudius Venbagen*,  
Merchant, in *London*. *London*, August 8, 1764.

Crowns 876, at 34 d. per Crown.

At six Days Sight, pay this my second of Exchange, (the

(the first not paid) to Mr. *James Jordin*, or Order, eight hundred seventy-six Crowns *Tournois*, at sixty So's *Tournois* the Crown, Value received at thirty-four Pence Sterling the Crown, as advised by  
To Mess. *Freeman and La Mort*, *Clement Goddard*,  
Merchants in *Paris*.

*Genoa July 9, 1764.*

For 650 Crowns, at 65 d. Sterling.

At ten days Sight, pay this my second of Exchange, (the first not paid) to Signior *Francisco Denomo*, or Order, six hundred and fifty Crowns, Exchange at sixty five Pence per Crown, Value received of himself, and place it to Account, as advised by  
To Mess. *Jackson and French*, *John Gerrard Gordon*,  
Bankers in *London*.

As foreign Bills of Exchange are often drawn at Usance, double Usance, Usance and a half, or Usance and so many Days, it will not be improper to inform the young Trader what Usance is, and how it is reckoned, in the several Parts of *Europe*.

Usance, therefore is a customary Time for the Payment of Foreign Bills of Exchange, passing from one Nation to another. The Usance of *London*, to and from *France*, *Amsterdam*, *Rotterdam*, *Antwerpt*, *Hamburg*, *Brabant*, *Zealand* and *Flanders*, is one Calender Month; and the double Usance two Calender Months. But the Usance of *London* to and from *Spain* or *Portugal*; is two Calender Months, and double Usance four Months. The Usance of *London* to and from *Italy*, is three Months, and double six Months.

If an accepted Bill be put off, when due it must be noted, that is, put into the Hands of a Notary Public, who will carry or send it to the Person upon whom it is drawn, and upon Refusal of Payment, upon any Pretence whatsoever he will protest it.

If a Bill be protested for Non-payment, you must send the Bill and Protest to the Person you received it of, who must forward the same till it comes to the Drawer, in order to recover all Costs, Charges, and Interests from him, or if he fails, from any of the Indorsers, if protested in due Time.

Though a Bill of Exchange be made payable to a particular Person, without mentioning the Word Order, such

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Bill may notwithstanding be indorsed, and if accepted, the Person who has accepted it, will be oblig'd to pay it, when due, to the Person to whom the same is indorsed.



### FORMS in LAW of general Use.

*A Bond to which any Condition may be placed.*

**K** NOW all Men by these Presents, that I (Richard Thompson, of Brentford in the County of Middlesex, Grocer) am held and firmly bound to (William Long, of Richmond, in the County of Surry, Gent.) in one hundred and sixty Pounds lawful Money of Great Britain, to be paid to the said (William Long) his certain Attorney, Executors and Administrators, for the Payment whereof I bind myself, my Heirs, Executors and Administrators, firmly by these Presents, sealed with my Seal, dated this twenty-fourth Day of January, in the fourth Year of the Reign of our Sovereign Lord George the Third) by the Grace of God of Great-Britain, France and Ireland, King Defender of the Faith, and so-forth, and in the Year of our Lord (one thousand seven hundred and sixty four)

#### *The Condition.*

The Condition of this Obligation is such, that if the above-bounden (Richard Thompson) his Heirs, Executors, or Administrators, do well and truly pay or cause to be paid unto the above-mentioned (William Long) his Executors, Administrators, or Assigns, the full Sum of (eighty Pounds) of good and lawful Money of Great Britain, on the (twenty-second Day of December) next ensuing the Date hereof, with lawful Interest for the same, then this Obligation to be void, or else to remain in full Force.

Sealed and delivered being Richard Thompson, S. P.  
first legally stamped, in  
the Presence of C. D.

Note, When a Bond or Condition is given in Consideration of the Value received, the Obligation is always to be made for double the Value in the Condition.

This, or the following Precedents, may be made agreeable to any Circumstances, only changing as Occasion shall require, what is inserted between ( ) The

The Date of all legal Instruments, Sums of Money and the Number of all other Things specified, must be, written in Words at Length, and in English, according to a late Act of Parliament.

In this Precedent, S. P. stands for Seal's Place, or the Place where the Seal is to be affixed.

*The Condition of a Bond given to stand to the Award of Arbitrators.*

THE Condition of this Obligation is such, that if the above-bounden (Charles Clinton of the City of London, Gent.) his Heirs, Executors and Administrators, and every of them, do and shall in all Things well and truly stand to, obey, and abide by, perform, fulfil and keep the Award, Order, Arbitrament, final End and Determination of (Richard Moor and Edward Elms of London, Merchants) Arbitrators indifferently named, elected and chosen, as well on the Part and Behalf of the above-bounden (Charles Clinton) as of the above-named (Francis Cox) to arbitrate, award, order, judge, and determine of and concerning all Manner of Action and Actions, Cause and Causes of Action and Actions, Suits, Bills, Bonds, Specialties, Judgments, Executions, Extents, Accompts, Debts, Dues, Sum and Sums of Money, Controversies, Trespasses, Damages, and Demands whatsoever, at any Time or Times heretofore had, made, moved, brought, commenced, sued, prosecuted, done, suffered, committed, and depending by, or between the said Parties; so as the Award be made and given up in Writing, under their Hands and Seals, ready to be delivered to the said Parties, on or before (the first Day of November next ensuing the Date hereof) but if the said Arbitrators do not make such their Award of, and concerning the Premises by the Time aforesaid, that then if the said (Charles Clinton) his Heirs, Executors, and Administrators, for his and their Parts and Behalf, do in all Things well and truly stand to, obey, abide, perform, fulfil, and keep the Award, Order, Arbitrament, Umpirage, final End and Determination of (George Grub of London, Merchant) Umpire indifferently chosen between the said Parties, to end the said Matter and Differences, so as the said Umpire do make his Award or Umpirage of, and concerning the Premises, and deliver

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the same in Writing, under his Hand and Seal, to the said Parties, on or before the (sixth Day of November, next ensuing the Date hereof, then this Obligation to be void, or else to remain in full Force.

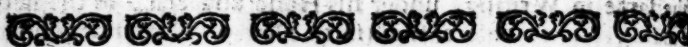
Sealed and delivered, being first legally stamped, in the Presence of, &c. Charles Clinton, S. P.

Note, In such Cases both Parties are mutually bound, and if an Umpire be not admitted the latter Part of the Condition beginning (but if the said Arbitrators) is to be omitted in this Instrument. But there should be added a Clause, signed and sealed by each Party, directing such Award to be entered and given as a Plea in either of the King's Courts at Westminster, in order to corroborate and render it final.

*A General Release.*

**K**NOW all Men by these Presents, that I (Charles Low, of Kensington, in the County of Middlesex, Grocer) have remised, released, and for ever quitted Claim; and by these Presents do for myself, my Heirs, Executors, and Administrators, remise, release, and for ever quit Claim, unto (Thomas Long, of Kingston, in the County of Surry, Innholder,) his Heirs, Executors, and Administrators, all and all Manner of Actions, Cause and Causes of Actions, Suits, Bills, Bonds, Writings, obligatory Debts, Dues, Duties, Accounts, Sum and Sums of Money, Judgments, Executions, Extents, Quarrels, Controversies, Trespasses, Damages and Demands whatsoever, both in Law and Equity, or otherwise howsoever, which against the said (Thomas Long) I ever had, now have, and which I, my Heirs, Executors, and Administrators, shall, or may have, claim, challenge, or demand, for or by Reason or Means of any Matter, Cause or Thing, from the Beginning of the World to the Day of the Date of these Presents. In Witness whereof I have hereunto set my Hand and Seal, the (twelfth Day of December, in the Year of our Lord (one thousand seven hundred and sixty four.)

Signed, sealed, and delivered, being first legally stamp'd, in the Presence of, Charles Low, S. P.



*A concise and easy* **METHOD** *of writing* **SHORT**  
**HAND.**

**S**hort-Hand ought to be brief, distinct, and easy. The shortest Expression is a Point. from which all Characters flow.

The Production of a Point generates a Line; the most simple is a right Line. —

A Line may be varied in Position; and will strike us with a different Conception of it, as it is differently formed. It may be placed four different Ways, horizontally — upright |, inclined to the right Hand', or to the left. Thus we gain four Characters.

Each of these Lines may be bent into a Curve two Ways towards the one Side, or towards the other; and will therefore supply two Curves. To instance in the horizontal and vertical Lines  $\equiv \cup$  ( $\cap$ ).

The two inclined Lines would also furnish four inclined Curves; but these are rejected to avoid Ambiguity.

These then are all the Marks which can be termed simple. Whatever Characters we need more, must be obtained by Composition.

The only regular Composition will be that of a Right Line and a Curve. This one Composition will supply our Wants. For by this we are furnished with four Variations to each of the four Positions of the Right Line.

The Connexion of these Characters will make no Confusion; since, none of them being angular, all Angles will denote the Junction of Letters.

The Letter *z*, or *s* hard, is so seldom used that it may be totally disregarded; or the Character for *s* may be strengthened for *z* in Writing. And the *j*, which is rarely used, may be sunk in the *g*.

Let us now arrange the Letters in the progressive Order of their Numbers; and add their proper Characters under them. When it will appear that the Characters of the simplest Expression are applied to those Letters which are in most frequent Use. See the following Table I.

Although

## Concise Method of writing Short-Hand. 409

Although a Character is here supplied for every Letter; it is not necessary that every Letter be expressed in short Writing. There are in every Word some radical Letters essential towards its Formation; these are the leading Letters in composing the Sound when spoken. These are generally the Consonants.

The Vowels, being liquid Expressions of the Voice, not often of farther Use than to connect the Pronunciation of several Consonants, may therefore be struck out of the Alphabet. *Y* is a kind of amphibious Letter, and rarely a Consonant. Its chief Use as a Consonant is the personal pronoun *you* and *your*; but for the Words the Letters *v*, and *w*, may conveniently stand.

The three Letters *c*, *k*, *q*, having the same Power, may be represented by one Mark. When the *c* is sounded soft, the Letter *s* naturally supplies its Place. The letter *q* never appears without being followed by *u*; in which Circumstance *k* is equally sufficient.

As *v* and *w* are nearly alike in Property, one Character may suffice for them. If a Distinction be thought needful, a little extraordinary Stress laid on the Pen may mark it.

The last Reduction will be to exterminate *x*; a Mark hardly to be esteemed a single Letter, but rather a Character, expressive of the Composition *ks*. As therefore no Word in the English Language begins with it; the Character for *ks* may be used for it.

The Alphabet, thus retrenched, consists of fourteen essential Letters:

b d f g h k l m n p r s t v.

which are expressed in the Table referred to.

This Set of Characters appears to be the simplest possible, reducible to Practice: The fewest in Number, the best in Form, and consistent with general Use. This is Short-Hand we have been hitherto seeking, methodical Construction, and built upon rational Principles.

The Elements of Short-Hand being comprised in four Characters, there is no extraordinary Skill required in writing them to express Words; the many Instructions for this Purpose given in Books, being chiefly Directions

N n

how

# 410 *Concise Method of writing Short-Hand.*

how to violate the Principles and Rules therein first laid down. Few Examples are given (see Table II.); the rather because Experience will soon teach to every Person the most convenient Forms of Composition, sooner than tedious Endeavours to imprint on Memory prescribed Rules. And because each Person will of Course, in Defiance of general Methods, contract peculiar Modes of Practice. The Words in this Table consist of a promiscuous Collection, not purposely chosen to shew the Methods to the best Advantage. For had this been done, these Characters are susceptible of many neat and happy Forms of Composition, which do not all occur in the Table, and which Practice will discover. Neither is the Reader troubled with grammatical Distinctions. He is already supposed to have some previous Knowledge of Grammar, and he can have no Occasion for Short-Hand; an Art in which Speed is the main Object: To improve which, Precision and Elegance are frequently dispensed with. It may be observed in general, that whenever any Obscurity may happen in Short Hand, the Connexion of the Sentences will assist in clearing it; which indeed is no more than we are frequently obliged to trust to, in reading common Writing.

Should any Person imagine this Alphabet imperfect, wanting an Expression for the Article A, the Point may be retained for it; and the Close of a Period may be noted by a vacant Space a little longer than what you leave between each Word.

Number is already expressed in Short-Hand, in a most happy Manner. All the Units under Ten, have a different Sign to denote them by; four or five of which are capable of expressing Sums of many Thousands. All that is necessary, is to use a Point instead of a Cypher. The Cypher is of no farther Use than to note Places of annexed Figures; for which Purpose a Point is equally serviceable, and more easily made.

Divinity, Law, Politics, Physic, &c. have many technical Terms frequently occurring, which, according as the present Exigence may hint, initial Capitals in common Writing may stand for; for nothing should be accepted as a Symbol, which is not strikingly figurative. And whatever is written hieroglyphically, ought to be distinguished

## *Concise Method of writing Short-Hand.* 411

from the regular Characters, either by Size or Stress of Hand.

To conclude : It is hoped that the Principles here laid down, and the Characters thence deduced and recommended, may be such, that every Person may form to himself a Method from them the most clear, regular, and consistent with those indispensable Properties, the shortest possible. We would only wish the Reader, while he looks over the following Tables, to observe once more, that all Vowels are dropt, and the essential Consonants constitute the Word.

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The



## The TABLES.

Tab. I.

b d f g h k l m n p r s t

Specimens from the above contracted Alphabet.

Tab. II.

|            |  |            |  |
|------------|--|------------|--|
| Answer     |  | Learning   |  |
| Body       |  | Love       |  |
| Brevity    |  | Mountain   |  |
| Courage    |  | Misfortune |  |
| Conscience |  | Novelty    |  |
| Danger     |  | Nitre      |  |
| Emperor    |  | Order      |  |
| Fortitude  |  | Ornament   |  |
| Fortunate  |  | Poverty    |  |
| Gratitude  |  | Rectitude  |  |
| Heaven     |  | Sincerity  |  |
| Horrible   |  | Token      |  |
| Knowledge  |  | Vanity     |  |
|            |  | Warrant    |  |
|            |  | Wisdom     |  |

*The Mystery of FREE MASONRY explained.*

**W**Heresoever Masonry is established, there is a Grand Master. The Person who now enjoys this Dignity in Great Britain is Washington Shirley, Earl Ferrers. He governs all the Lodges, and delivers the Laws of the Society to the several subordinate Masters. He holds a Meeting or Lodge when he thinks proper. This is generally the second Saturday in every Month in Summer; but oftener in Winter.

The other Lodges meet regularly twice a Month in Winter, and once a Month in Summer. The Expence of these Meetings is defrayed by the Quarterly Payments of the Members, which are from three Shillings and Sixpence to five Shillings.

There are also Quarterly Meetings, when the Wardens of every Lodge in and about London bring in different Sums of Money for the Treasurer General for charitable Uses. But these Charities are confined to Masons only; who are occasionally assisted with 5, 10, or 20 Pounds. Smaller Sums are given to indigent Members, in Proportion to their Wants and long standing. Large Sums are likewise sent in from Lodges in the East and West Indies; whence Accounts are transmitted of the Growth of Masonry.

There can be no Lodge unless one Master, three Fellow Crafts, and two Apprentices are present. In each there are two principal Officers under the Master, called Senior and Junior Wardens. They see that the Laws of the Society are adhered to, and the Grand Master's Word Command regularly followed.

He who is desirous of being a Free Mason, must get the Member to propose him as a Candidate, who is to acquaint the Brethren with his Qualifications. His Advancement being ordered, he must go with the Proposer the next Lodge Night.

The Lodges are held at about Seven o'Clock in the Winter and Nine in the Summer. The Master, the two Assistants, Secretary and Treasurer, begin with putting over their

Necks a triangular blue Ribbon. To the Master's hang a Rule and Compass of Gold or gilt. The Assistants, senior Wardens, and the other Officers, carry the Compass only. The Candles are placed in a triangular Form. Every Brother has an Apron of white Skin. The Master seats himself in the first Place on the East Side. The Bible is open before him. The Compasses are laid thereon, the Points being cover'd with a Lignumvitæ or Box Square. The senior and junior Wardens are opposite to him on the West and South. The Brethren take Place according to Seniority, and have before them Wine, Punch &c. This done, after a few Minutes, the Master opens the Lodge thus,

*Master to the Junior Deacon.* What is the chief Care of a Mason?

*Ans.* To see that the Lodge is tyled.

*Mastr.* Pray do your Duty.

[Here the Junior Deacon gives three Knocks at the Door; and if no body is nigh, the Tyler, who is the Guard on the other Side and always a Brother, answers by three Knocks more; then the Junior Deacon says to the Master]

*Jun. Deacon.* Worshipful, the Lodge is tyled.

*Mastr.* Pray where is the junior Deacon's Place in the Lodge?

*Jun. Deacon.* At the Back of the Senior Warden; or at his right Hand, if he permits him.

*Mastr.* Your Business there?

*Jun. Deacon.* To carry Messages from the senior to the junior Warden, so that they may be dispersed round the Lodge.

*Master to the Senior Deacon.* Pray where is the Senior Deacon's Place in the Lodge?

*Sen. Deacon.* At the Back of the Master, or at his right Hand, if he permits.

*Mastr.* Your Business there?

*Sen. Deacon.* To carry Messages from the Master to the senior Warden.

*Mastr.* The junior Warden's Place in the Lodge?

*Ans.* In the South.

*Master to the junior Warden.* Why in the South?

*Jun. Warden's Ans.* The better to observe the Sun at high Meridian, to call the Men off from Work to Refreshment, and to see that they come on in due Time, that the Master may have Pleasure and Profit thereby.

*Mastr.* Pray where is the Senior Warden's Place in the Lodge?

*Jun. Warden.* In the West.

*Master to the Senior Warden.* Your Business there Brother?

*Senior Warden's Ans.* As the Sun sets in the West to close the Day, so the Senior Warden stands in the West to close the Lodge, to pay the Men their Wages, and dismiss them from their Labour.

*Mastr.* The Master's Place in the Lodge?

*Ans.* In the East.

*Mastr.* His Business there?

*Ans.* As the Sun rises in the East to open the Day, so the Master stands in the East to open his Lodge, and set his Men to Work. [Then the Master takes off his Hat and says]

*Mastr.* "This Lodge is open, in the Name of holy St. John, forbidding all Cursing, Swearing, or Whispering, and all profane Discourse whatever, under no less Penalty than what the Majority shall think proper."

The Master then gives three Knocks upon the Table with a wooden Hammer, and puts on his Hat; the other Brethren being uncover'd: They then sit down, eat, drink and smoke promiscuously.

Soon after the Master asks, if the Gentleman proposed last Lodge-Night is ready to be made? if so, he orders the Wardens to go out and prepare the Person, who is generally waiting in a Room by himself. He is now conducted into another Room, which is totally dark, and then asked, whether he is conscious of having the Vocation necessary to be received? On answering Yes, he is asked his Name, Surname and Profession. Having answered these Questions, whatever Metal he has about him is taken from him, as Buckles, Buttons, Rings, Money, &c. Then they make him uncover his right Knee and put his left Foot, with the Shoe on, into a Slipper; or else only slip the Heel of the Shoe down; hoodwink him with an Handkerchief, and leave him for about Half an Hour.

The

The Chamber is guarded by Brethren with their drawn Swords. He, who proposed the Candidate, stays with him; but they are not permitted to converse together.

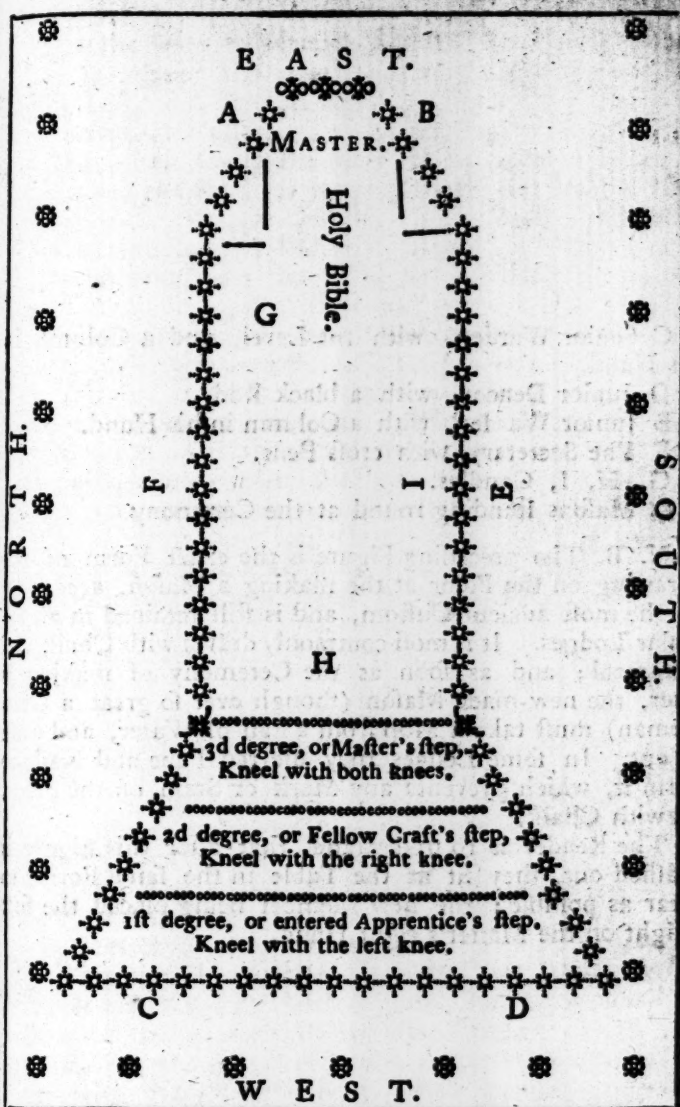
All this while the Brethren in the Lodge are putting Things in Order for his Reception there; as drawing the annex'd Figure on the upper Part of the Floor with Chalk, or Charcoal mix'd, or forming it with Tape and little Nails. It is drawn East and West. The Master stands in the East, with the Square hanging at his Breast, the Bible open at St. John's Gospel; and three lighted Candles are placed in triangular Form in the Midst of the Figure.

The Proposer then goes and knocks three Times at the Door. The Master answers by three Strokes with the Hammer. The Junior Warden asks, Who comes there? The Candidate, as he is prompted, answers, "One who begs to receive Part of the Benefit of this  
" Right Worshipful Lodge, dedicated to St. John, as  
" many Brothers and Fellows have done before me."

Then

A S  
B P  
String





### E X P L A N A T I O N .

A Senior Deacon, with a black Rod.  
 B Pass Master, with the Sun and Compasses, and a  
 String of Cords.

C Se-

C Senior Warden, with the Level, and a Column in his Hand.

D Junior Deacon, with a black Rod.

E Junior Warden, with a Column in his Hand.

F The Secretary, with cross Pens.

G, H, I, Candles.

Masons standing round at the Ceremony.

N. B. The preceding Figure is the exact Form of the Drawing on the Floor at the making a Mason, according to the most ancient Custom, and is still retained in all regular Lodges. It is most commonly drawn with Chalk and Charcoal; and as soon as the Ceremony of making is over, the new-made Mason (though ever so great a Gentleman) must take a Mop from a Pail of Water, and wash it out. In some Lodges they use red Tape and Nails to form it, which prevents any Mark or Stain on the Floor, as with Chalk.

The Reader is to understand, that after this Figure is washed out, they sit at the Table in the same Form, as near as possible; the new Member being placed the first Night on the Master's right Hand.

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Then the Door is opened, and the Wardens, or their Assistants, receive him, one on the Right and the other on the Left, and conduct him blindfold three Times (in some Lodges nine Times) round the Figure on the Floor, and bring him up to the Foot of it, with his Face to the Master, the Brethren ranging themselves behind him, and on each Side the Figure. The Master then asks, Whether you have a Desire to become a Mason? and, if it is of your own free Will and Choice? Being answer'd, Yes, he says, "Let him see the Light." While they are unbinding him, the Brethren encircle him round with their drawn Swords presented to his Breast. He is then directed to advance three Times to a Stool at the Foot of the Arm-Chair; and taught to step in the proper Manner. On the Stool are placed the Rule and Compass. One of the Brethren says to him; "You are now entering into a respectable Society, which is more serious and important than you imagine. It admits of nothing contrary to Law, Religion, or Morality; nor does it allow of any Thing inconsistent with the Allegiance due to his Majesty; the Worshipful Grand Master will inform you of the Rest."

This done; he is desir'd to put his right Knee on the Stool, bare; his left Foot, with the Shoe on, is put into a Slipper, or the Shoe is slipped at the Heel. In this Posture, the Grand Master says to him, "Do you promise never to tell, write or disclose, in any Manner whatever, the Secrets of Free Masonry and Free Masons, except to a Brother at the Lodge, and in the Presence of the Worshipful Grand Master?"

*Ans.* "I do."

His Breast is then opened, and the Point of a Pair of Compasses placed upon his naked left Breast, and he himself holds it with his left Hand, his Right being laid upon the Gospel opened, and he repeats an Oath after the Master, the Form of which differs in many Lodges, importing that "he obliges himself to make no Manner of Discovery, under no less Penalty than to have his Throat cut across, his Tongue torn out by the Root, and to be buried in the Sands of the Sea, at Low Water Mark, a Cable's Length from the Shore, where the Tide ebbs and flows twice in twenty-four Hours,

"Hours. So help me God, and keep me steadfast in  
"this my entered Apprentice's Obligation." [*He kisses  
the Book.*]

In the Midst of this Ceremony, the Ancient Masons  
used a set Prayer, which is now omitted, and in different  
Lodges, the Forms of Making vary in some Respects.

The Oath being taken, he is taught the Sign, Grip  
and Pass-Word of the entered Apprentice; and is taught  
how to advance to the Master upon the Drawing on the  
Floor. They also draw other Figures besides this (which  
is termed a Mosaic Palace), as the laced Tuft, and  
the Throne beset with Stars. There is also represented  
the Plumb-Line, and the Tomb of *Hiram*, whom they  
call the first Grand Master. These are all explain'd to  
him and the Ornaments of the Order described. Being  
then conducted back, all that he was divested of is re-  
stored, and he takes his Seat on the right Hand of the  
Master. He receives an Apron, which he puts on, and  
the List of the Lodges is likewise given to him.

He is now congratulated, and all return to the Table to  
regale. His Health is proposed by the Master, and drank  
by the Body. He then takes a Bumper and drinks "to  
"the Worshipful Grand Master, the Senior and Junior  
"Wardens, the Rest of the Officers, and Members of the  
"Lodge, wishing them Success in all their public and  
"private Undertakings, to Masonry in general, and that  
"Lodge in particular, craving their Assistance." To  
which they answer, "they will assist him." Having  
drank, he throws his Glass from him, and brings it back  
three Times, and then sets it down, the Rest doing the  
same in exact Order. This is called Firing. Then they  
clap their Hands nine Times, divided into three, and stop  
between each, keeping true Time.

They have other Toasts, as "To the Heart that con-  
"ceals, and the Tongue that never reveals." "The  
"King and the Royal Family." "All Brethren whereso-  
"ever dispersed." These are all drank with three Times  
three, in a most regular Manner, and with an Huzza  
at the End of each.

There are three Degrees of Masons, the entered Ap-  
prentice, the Fellow Craft, and the Master. There is  
some Peculiarity in the making of each; a different Lec-  
ture,

ture, and the Sign, Grip, and Word are different in all. The entered Apprentice is commonly made a Fellow Craft the same Evening. In the doing of which all Metal is taken from him, as before. He gets Admittance by three Knocks; begs to be admitted a Fellow Craft; gives the Pass Word; is led twice round the Lodge, and makes the same Repetition at the Back of the Senior Warden and the Master which he did at the Door: He is then instructed by the Senior Warden to shew the Master his due Guard, to take two Steps upon the second Step of a right angled oblong Square, with his right Knee bent bare, his left Foot forming a Square, his Body upright, his right Hand on the Bible, his left Arm supported by the Point of the Compasses, forming a Square; and takes the Obligation, swearing, "that he will never reveal the Part of a Fellow Craft, that he will answer all Signs and Summons sent from a Lodge of Crafts within the Length of a Cable-Tow, i. e. three Miles; that he will not wrong a Brother, nor see him wronged, but will give him Notice of all Dangers, will assist him without Detriment to his Family, will keep all his Secrets, Murder and Treason excepted, under Penalty of having his Heart torn from his naked left Breast, and given to the Vultures."

When a Master is made, he is led to the Door of the Lodge, with his Shoes off, his Arms and Breast naked, and deprived of all Metal; gains Admittance by three Knocks, and begging to be admitted a Master, is led round the Lodge, and makes the same Request at the Back of the Master; is then instructed by the Senior Warden as he stands in the West, *First*, to shew the Master in the East the due Guard or Sign of an entered Apprentice, and to take one Step upon the first Step of the right Angle of an oblong Square, with his left Foot forming a Square.

*Secondly*, To take two Steps upon the same oblong Square, with both Knees bent and bare, his Body upright, his right Hand upon the Bible, the Points of a Pair of Compasses directed to his right and left Breast, and he swears, "never to reveal the Part of a Master Mason," &c. as in the last Case; and further swears, "to conform himself to all the Laws and Constitutions of the Lodge, under the Penalty of having his Body severed in two;

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“ the one Part carried to the South, the other to the North; his Bowels burned to Ashes, and scattered to the four Winds, that no farther Remembrance of so vile a Wretch may exist, &c.” He is then shewn the Sign, and gives the Grip and Word of an entered Apprentice and of a Fellow Craft, and is told that he now represents the Grand Master *Hiram*, whose Death is thus related,

“ There were originally fifteen Fellow Crafts, who perceiving the Temple almost finished, and not having received the Master’s Word, grew impatient, and agreed to extort it from the Master *Hiram*, that they might pass for Masters in other Countries, and receive the Wages of such. But before they could accomplish their Scheme, twelve recanted. The other three determined to have it by Force, if no other Way could be found. Their Names were *Jubela*, *Jubelow*, and *Jubelum*. Now it was *Hiram*’s Custom at Twelve at Noon, when the Men were called off to refresh themselves, to go into the *Sanctum Sanctorum*, to worship the true and living God. The three Assassins placed themselves at the East, West, and South Doors of the Temple. At the North was no Entrance, because the Rays of the Sun never darted from that Point.

“ *Hiram* finished his Prayer and came to the East Door, which he found guarded by *Jubela*, who resolutely demanded the Master’s Grip. *Hiram* answered, that it was not customary to ask it in such a Strain; that himself did not receive it so; that he must wait, and Time and Patience would bring it about. He said farther, that it was not in his Power alone to reveal it, but in the Presence of *Solomon* King of *Israel*, and *Hiram* King of *Tyre*. *Jubela*, dissatisfied with this Answer, struck him across the Throat with a 24 Inch Gauge. *Hiram*, on this Usage, flew to the South Door of the Temple, where he was met by *Jubelow*, who asked him the Master’s Grip and Word in like Manner. On receiving the same Answer, he gave him a violent Blow with a Square upon his left Breast, which made him reel. On recovering his Strength, he ran to the West Door, and, on being interrogated in the same Manner by *Jubelum*

“ an

"and replying as at first, he received a terrible Fracture  
"upon his Head,

[Here the Junior Warden strikes you with a 24 Inch  
Gauge across the Throat; the Senior Warden strikes you  
with a Square on the left Breast; and the Master on the  
Head with the Gavel.]

"with a Gavel or Setting Maul, which occasioned his  
"Death. They then carried the Body out at the West  
"Door, and hid it under some Rubbish till Twelve the  
"next Night, when they buried him on the Side of a  
"Hill in a Grave six Feet perpendicular, dug due East  
"and West.

"*Hiram* not coming to view the Workmen as usual,  
"Solomon caused strict Search to be made. This proving  
"ineffectual, he was supposed to be dead. The twelve  
"Fellow Crafts, who recanted, hearing the Report, went  
"to Solomon with white Aprons and Gloves, Emblems of  
"their Innocence, and informed him of all they knew,  
"and offered their Assistance to discover the three other  
"Fellow Crafts, who had absconded. They divided  
"themselves into four Parties, three East, West, North,  
"and South, in Quest of the Murderers. As one of the  
"twelve was travelling on the Sea Side near *Joppa*, being  
"fatigued, he sat down to refresh himself; but was soon  
"alarmed by the following hideous Exclamations from  
"the Cliff of a Rock,

"Oh! that my Throat had been cut across, my  
"Tongue torn out by the Root, and I had been buried in  
"the Sands of the Sea at Low Water Mark, a Cable's  
"Length from the Shore, where the Tide ebbs and flows  
"twice in 24 Hours, ere I had consented to the death of  
"our Grand Master *Hiram*!"

"Oh! (says another) that my Heart had been torn  
"from my naked left Breast, and given a Prey to the  
"Vultures of the Air, rather than I had been concerned  
"in the Death of so good a Master!"

"But (says a third) I struck him harder than you  
"both; 'twas I that killed him. Oh! that my Body  
"had been severed in two, and scattered to the South and  
"North; my Bowels burned to Ashes in the South, and  
"scattered between the four Winds of the Earth, ere I

"had been the Cause of the Death of our good Master  
"Hiram!

"The Fellow Craft hearing this, went in Quest of his  
"two Associates, and they entered the Cliff of the Rock,  
"took and bound them fast, and brought them to King  
"Solomon, before whom they confessed their Guilt, and  
"begged to die. The Sentence passed on them was the  
"same which they expressed in their Lamentation: *Jubi-*  
"*la's* Throat was cut across, *Jubelow's* Heart was torn  
"from his left Breast, and *Jubelum's* Body was severed in  
"two and scattered in the South and North.

"When the Execution was over, King Solomon sent for  
"the twelve Crafts, and desired them to take up the Bo-  
"dy of Hiram, that it might be solemnly interred in the  
"Sanctum Sanctorum. He also told them, that if they  
"could not find a Key Word about him, it was lost; for  
"there were not above three in the World to whom it  
"was known, and unless they were present, it could not  
"be delivered. Hiram being dead, it was consequently  
"lost. However, they went and cleared the Rubbish,  
"and found their Master in a mangled Condition, having  
"lain 15 Days; upon which they lifted up their Hands a-  
"bove their Heads in Astonishment, and said, O Lord,  
"my God! This being the first Word and Sign, King So-  
"lomon adopted it as the grand Sign of a Master Mason,  
"and it is used to this Day in all the Lodges of  
"Masters."

In this Ceremony the Blow on the Head is frequently so  
severe, that the Candidate falls backward on the Floor,  
and is told, "that he now represents one of the greatest  
"Men in the World lying dead, their Grand Master  
"Hiram."

Their Lectures are an Explanation of the three Institu-  
tions, and of the Sign, Grip, and Word, by Question  
and Answer. The Master proposes the Questions, and as-  
sists the Brethren in making the proper Answers. Every  
Mason answers in his Turn at Table, like Boys at their  
Catechism. This is termed Working. If a Member  
cannot, or does not chuse to, work, when it comes to his  
Turn, he claps his Hand on his Breast, and begs the Mas-  
ter to excuse him.

*The Sign, Grip, and Word of the entered Apprentice.*

*The Sign.* Draw your Hand across your Throat edgeways. The Penalty of the Oath being, that he would sooner have his Throat cut, than discover the Secrets of Masonry.

*The Grip.* Take a Brother with your right Hand, and press hard with your Thumb Nail upon the first Joint of the Fore Finger of his right Hand.

*The Word.* Whisper in his Ear, *Jachin.*

*The Sign, Grip, Word, and Clap of a Fellow Craft.*

*The Sign.* Put your right Hand to your left Breast, keep your Thumb square, and your left Hand upright, forming a Square.

*The Pass Grip* is by putting the Thumb Nail of your right Hand between the first and second Joint of a Brother's right Hand.

*The Pass Word* is *Shibboleth.*

*The Grip* is the same as the Pass Grip, except pressing your Thumb Nail on the second Joint, instead of between the first and second.

*The Word* is *Boaz.*

*The Clap* is by forming the Sign of a Craft, as above, holding your left Hand square and upright; then clap your right and left Hands together; afterwards strike your left Breast with your right Hand, and thence give a Slap on your Apron, your right Foot going at the same Time.

*The Master's Sign, Grip, Word, and Clap.*

*The Sign.* Draw the right Hand edgeways across your Belly, which is the Penalty of the Oath.

*The Grip.* Take hold of the right Hand with your right Hand, and press the four Finger Nails hard under the Wrist of his right Hand; put your right Foot to his right Foot, your right Knee to his right Knee, and his right Breast to yours, with your left Hand supporting his Back.

*The Word* is *Mahabone*, or in some Lodges *Mac-benach.*

*The Pass Word* is *Tubal Cain.*

*The Master's Clap* is by holding both your Hands above your Head and striking them down at once upon your Apron, both Feet keeping Time.

A Master is installed yearly on St. John's Day, on the Approbation of the Grand Master, and the Oath of Office is administered to him by the late Master, which he takes under the Penalties of having his Throat cut across, his Tongue torn out, his Heart torn from his left Breast, and his Body severed in two. Then the late Master raises him up, takes off the Jewel and Ribbon from his own Neck, and puts it on the new Master, taking him by the Master's Grip, and whispering in his Ear the Word *Chibbelum*. After which he slips his Hand from the Master's Grip to the Elbow, and presses his Nails in, as in the Grip of the Master under the Wrist.

The Senior and Junior Warden, Secretary, &c. receive the same Obligation, except the Grip and Word, there being none peculiar to them.

On Lodge Nights the Table is plentifully stored with Wine, Punch, &c. Every Man has a Glass before him, and drinks what and when he pleases, only he must drink his Glass in Turn, or at least keep the Motion with the Rest.



*The common Notion of Spirits, Apparitions and Witches; their Power and Feats exposed, very necessary to be read and attended to by all young Persons, to prevent their imbibing false Notions and groundless Fears about these supposed airy Beings, which are no where to be found but in the weak, superstitious, and too credulous Part of Mankind, who are too apt, by idle Tales, to make a wrong Impression on young Minds, which some, to their great Injury and Disquietude, never shake off during their Lives.*

**W**E are told in Holy Writ, that young Men shall see Visions, and old Men dream Dreams; which frequently happens; and that false Prophets shall arise and do Wonders, which shall deceive almost the Elect; but we are bid to disbelieve them; which, if they worked true Miracles, we could not do, without rejecting all Miracles. For how can we believe any Thing to be miraculous, and at the same Time disbelieve another Thing to be so, without be-  
ing



ing able to shew any Difference between them? And therefore we may acquiesce in an Assurance that such Pretenders must be Cheats, and their Actions Impostures and Deceits upon our Senses.

Whenever God works Wonders, or produces those Events which shall appear as such to us, he always does them for wise Reasons, either to warn and inform Men, to make them Examples of his Justice, or to communicate his Will, and teach us some Doctrine; and he takes the most proper and effectual Means to attain his Ends, and force our Belief, by making such Applications to our outward Senses, and such Impressions on our Understandings, as we must submit to and acquiesce in, unless we resolve to give up all Certainty; or else by Predictions which are justified by the Event, and which are undoubtedly Miracles. He does them in the most open Manner before Crowds at once; but our modern Miracle-mongers do them all in Secret, in Corners, and in the Dark; and their Spirits and Apparitions are seen only by melancholy, enthusiastick, and dreaming old Men and Women, or by crazy young ones, whose Heads are intoxicated and prepared for these Stories long before; and they are generally seen but by one at once, who is always in a Fright when he does see them; or else they are the Tricks and Juggles of Heathen and Popish Priests, or pretended Conjurers, to pick Mens Pockets, and promote some knavish and selfish Design. They are never done before a House of Lords or Commons, or in a Prince's Court, or in the Streets before Multitudes of People, or in the Sight of several Men at the same Time, of clear and unprejudiced Understandings, or of unquestionable Integrity.

When our Saviour appeared to all his Disciples together, he appealed to their Senses, and bid them not be afraid, but to put their Hands into his Side, and believe themselves: He made his Ascension before five hundred People at once: His Miracle of the Loaves and Fishes was before five thousand: His turning Water into Wine was at a public Wedding; and the rest were of the same Kind: He went through *Judea* from Place to Place, publicly doing Miracles, confirming and convincing all; who were not wilfully blind, of the Truth of his Mission; and teaching a Doctrine of infinite Advantage to Mankind:

Whereas

Whereas our present Workers or Seers of Miracles never tell us any Thing worth knowing; and we have no other Evidence that they are seen or done, but the Veracity of those who tell them, who may be deceived themselves, or invent Lyes to deceive others. The Proof ought always to be equal to the Importance of the Thing to be believed: For, when it is more likely that a Man should tell a Lye, or be deceived, than that a strange Phænomenon should be true, methinks there should be no Difficulty to determine on which Side of the Question we should give our Assent; though in Fact most Men are so prepared by Education to believe these Stories, that they will believe the Relation of them in these Cases, when they will believe the Relators in nothing else.

If one or two Men affirm that they saw another leap twenty Yards at one Leap, no one will doubt but they are Lyars; but if they testify they saw a Goblin, with Saucer Eyes and cloven Feet, in a Church-Yard, leap over the Tower, all the Town is in a Fright, and few of them will venture to walk Abroad in a dark Night. Sometimes these Phantoms appear to one who is in Company with others, and no one can see them but himself, and yet all the rest are terrified at his Relation, without reasoning that they have the same or better Faculties of seeing than he has; and therefore that his Organs must either be indisposed, or that he designs to impose upon them: But it passes for a Miracle; and then all Doubts are solved, and all Enquiries at an End. All Men believe most of those Stories to be false; and yet almost all believe some of them to be true, upon no better Evidence than they reject the rest. The next Story of an old Woman inhabiting a Cat, or flying in the Air upon a Broomstick, sets them a staring, and puts their Incredulity to a Nonplus.

We often hear of a Spirit appearing to discover a Silver Spoon, a Purse of hidden Money, or perhaps a private Murder; but are never told of a Tyrant, who by private Murders has slaughtered Thousands, and by public Butcheries destroyed Millions, ever dragged out of his Court by good or evil Spirits, as a Terror to such Monsters. Such an Instance would convince all Mankind; and if Almighty God thought fit to work by such Engines,

and

and intended that we should believe in them, or any of them, it is impossible to believe but that he would take the properest Methods to gain our Assent.

From what I have said, and much more which might be said, I think I may with great Assurance conclude, that these capricious and fantastical Beings are not suffered to interfere and mingle with human Affairs, only to mislead Men, and interrupt them in the Pursuit of their Duty; nor can I see any Foundation, in Nature, Reason, or Scripture, to believe that there are any such as they are usually represented to us; which neither agree and keep up to the Characters, Dignity, and Excellence of good Angels, or the Sagacity, Office, and Use of bad ones. Where are we commanded to believe that the Devil plays hide and seek here on Earth; that he is permitted to run up and down and divert himself, by seducing ignorant Men and Women; killing Pigs, or making them miscarry; entering into Cats, and making Noises, and playing Monkey-Tricks in Church-Yards and empty Houses, or any where else here on Earth, but in empty Heads.

We know that he was cast headlong from Heaven, is chained fast in the Regions of the Damned, and kept by the Power of the Almighty from doing Mischief to his Creatures; and to say the contrary seems to me the highest Blasphemy against Heaven itself: For when we every Day see and feel the many Delusions to which human Condition is subject, how we are the Properties of Impostors, the Slaves to Tyrants, and perpetual Dupes of one another, and indeed are subject to daily and endless Frauds and Impositions; how shall we be a Match for the most subtle and most sagacious Being out of Heaven? And is it possible to believe, that the good, merciful, and all-wise God should, desert, leave, and betray us to so unequal a Combat, without giving to us suitable Precautions, Capacities, and Powers to defend ourselves.

I shall conclude by observing, that the Heathen Poets first invented these Stories, and the Heathen Priests stole them from them; as Badgers dig Holes for themselves, and afterwards are stunk out of them by Foxes.

*A List of Professions, Trades, and Occupations, used in  
England, in alphabetical Order.*

A Divine or Clergyman  
Counsellor at Law  
Physician or Doctor of Physic

**A**nchor Smith  
Anvil Smith  
Apothecary  
Appraiser  
Architect  
Armourer  
Attorney at Law  
Back Maker  
Baker  
Bisket Maker  
Banker  
Barber  
Basket Maker  
Bedstead Maker  
Bell Founder  
Bellows Maker  
Bird-Cage Maker  
Blacksmith  
Blackwell-Hall Factor  
Block Maker  
Block-Head Maker  
Blue Maker  
Boat Builder  
Bodice Maker  
Bookseller  
Bookbinder  
Box Maker  
Brass Founder  
Brazil  
Bricklayer  
Brick Maker  
Breeches Maker

Brewer  
Bridle Cutter  
Brocade Weaver  
Broom Maker  
Buckle Maker  
Buckle Chafe Maker  
Buckram Maker  
Burnisher  
Butcher  
Button Maker  
Button Mould Maker  
Buttonseller  
Cabinet Maker  
Calenderer  
Calico Printer  
Cap Maker  
Card Maker  
Carpenter  
Carpet Maker  
Carpet Weaver  
Carver  
Catgut Spinner  
Chair Carver  
Chair Maker  
Chandler  
Chaser  
Cheefemonger  
Cheefe Factor  
Chymist  
Child's Coat Maker  
Chimney Sweeper  
China Man

Chocolate

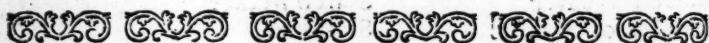
|                          |                                     |
|--------------------------|-------------------------------------|
| Chocolate Maker          | Fan Painter                         |
| Clasp Maker              | Fan Maker                           |
| Clock Maker              | Fan-Stick Carver                    |
| Clothier                 | Farrier                             |
| Coach Maker              | Fellmonger                          |
| Coach Buckle Maker       | File Cutter                         |
| Coach Carver             | Fine Drawer                         |
| Coach Currier            | Fish Hook Maker                     |
| Coach Founder            | Fishmonger                          |
| Coach Harness Maker      | Flatter                             |
| Coach Painter            | Flax Dresser                        |
| Coach Wheeler            | Fringe, Frog and Tassel Ma-<br>ker  |
| Coal Crimps              | Fruiterer                           |
| Coal Merchant            | Fuller                              |
| Coffee-House-Man         | Furrier                             |
| Collar Maker             | Gardener                            |
| Colour-Man               | Gilder                              |
| Comb Maker               | Gingerbread Maker                   |
| Coney Wool Cutter        | Girdler                             |
| Confectioner             | Girth Weaver                        |
| Cooper                   | Glass Maker                         |
| Copper Smith             | Glass Grinder                       |
| Copper plate Printer     | Glass and Picture Frame Car-<br>ver |
| Cork Cutter              | Glass and Picture Frame Ma-<br>ker  |
| Corn Chandler            | Glass Seller                        |
| Corn Factor              | Glazier                             |
| Currier                  | Glover                              |
| Cutler                   | Gold Beater                         |
| Designer                 | Goldsmith                           |
| Dial-Plate Enameller     | Gold and Silver Wire Drawer         |
| Diamond Cutter           | Grocer                              |
| Distiller                | Gun Engraver                        |
| Druggist                 | Gun Smith                           |
| Dry Salter               | Gun Stock Maker                     |
| Dyer                     | Haberdasher of Hats                 |
| Earthen Ware Shopkeeper  | Haberdasher of Small Wares          |
| Edge Tool Maker          | Hair Cutter                         |
| Embroiderer              | Hair Merchant                       |
| Enameller                | Hardware-Man                        |
| Engineer or Engine Maker |                                     |
| Engraver                 |                                     |
| Exchange Broker          |                                     |



|                      |                          |
|----------------------|--------------------------|
| Hartshorn Rasper     | Loriner or Bit Maker     |
| Hatband Maker        | Malster                  |
| Hat Maker            | Marble Paper Maker       |
| Hat Finisher         | Mariner                  |
| Hat Shopkeeper       | Mason                    |
| Holster Case Maker   | Mast Maker               |
| Hoop Petticoat Maker | Mathematical Instrument  |
| Horner               | Maker                    |
| Horn Button Maker    | Silk Mercer              |
| Horn Presser         | Merchant                 |
| Horse Millener       | Metzotinto Engraver      |
| Hosier               | Miller                   |
| Hot Presser          | Milwright                |
| Hour Glass Maker     | Millener                 |
| House Carver         | Money Scrivener          |
| House Painter        | Muffin Maker             |
| Jack Smith           | Music Shopkeeper         |
| Japanner             | Musician                 |
| Jeweller             | Needle Maker             |
| Working Jeweller     | Net Maker                |
| Ink Maker            | Net Shopkeeper           |
| Insurance Broker     | Notary Public            |
| Joiner               | Organ Builder            |
| Iron Hoop Maker      | Oilman                   |
| Iron Founder         | Orange Merchant          |
| Ironmonger           | Orrice Weaver            |
| Ivory Turner         | Optical Instrument Maker |
| Lapidary             | Packer                   |
| Last and Heel Maker  | Packthread Spinner       |
| Leather Cutter       | Paper Hanging Maker      |
| Leather Seller       | Paper Maker              |
| Letter Founder       | Patten Maker             |
| Landscape Painter    | Pastry Cook              |
| Land Surveyor        | Patten Drawer            |
| Lace Man             | Paviour                  |
| Lace Shop Keeper     | Pawn Broker              |
| Letter Case Maker    | Pen Cutter               |
| Lighter Builder      | Pencil Maker             |
| Linen Draper         | Perfumer                 |
| Lock Smith           | Pewterer                 |
| Livery Lace Weaver   | Picture Frame Maker      |
| Loom Maker           | Piece Broker             |

|                     |                                      |
|---------------------|--------------------------------------|
| Pin Maker           | Ship Joiner                          |
| Plasterer           | Ship Painter                         |
| Plane Maker         | Shoe Maker                           |
| Plate Case Maker    | Silkman                              |
| Plumber             | Silk Throwster                       |
| Portrait Painter    | Silk Weaver                          |
| Potter              | Silver Caster                        |
| Poulterer           | Silver Buckle Maker                  |
| Press Maker         | Silver Smith                         |
| Printer of Stuffs   | Silver and Gold Thread Spin-<br>ners |
| Printer of Books    | Silver Turner                        |
| Printer's Joiner    | Skinner                              |
| Printer's Smith     | Shop Keeper                          |
| Printseller         | Snuff Shop Keeper                    |
| Proctor             | Snuff Box Maker                      |
| Publisher           | Solicitor in Chancery                |
| Pump Maker          | Soap Boiler                          |
| Quilter             | Spectacle Maker                      |
| Rag Merchant        | Spangle Maker                        |
| Refiner             | Starch Maker                         |
| Ribbon Weaver       | Stationer                            |
| Rivetter of Saddles | Statuary                             |
| Robe Maker          | Stay Maker                           |
| Rope Maker          | Stocking Weaver                      |
| Saddler             | Stocking Trimmer and Press-<br>er    |
| Sail Cloth Maker    | Stucco Worker                        |
| Sail Maker          | Stuff Shop Keeper                    |
| Salesman            | Sugar Baker                          |
| Saw Maker           | Surgeon                              |
| Sawyer              | Surgeon's Instrument Maker           |
| Scale Maker         | Sword Cutler                         |
| School Master       | Tallow Chandler                      |
| Scowerer            | Tanner                               |
| Screen Maker        | Tassel Maker                         |
| Scrivener           | Taylor                               |
| Seedsman            | Teaman                               |
| Setter              | Threadman                            |
| Shagreen Case Maker | Timber Merchant                      |
| Ship Builder        | Tinman, or Tin Plate Wor-<br>ker     |
| Ship Carpenter      |                                      |
| Ship Carver         |                                      |
| Ship Chandler       |                                      |

|                         |                          |
|-------------------------|--------------------------|
| Tire Smith              | Watch Movement Maker     |
| Tire Woman              | Watch Slide Maker        |
| Tobacconist             | Watch Springer and Liner |
| Tobacco Paper Maker     | Watch Spring Maker       |
| Toyman                  | Wax Chandler             |
| Toy Maker               | Wax Figure Maker         |
| Tree Maker for Saddles  | Weaver                   |
| Tripeman                | Whalebone Merchant       |
| Trunk Maker             | Wheelwright              |
| Truss Maker             | Whip Maker               |
| Turner                  | Wine Cooper              |
| Vinegar Maker           | Wine Merchant            |
| Vintner                 | Wood Cutter              |
| Undertaker              | Wood Monger              |
| Upholsterer or Upholder | Wool Card Maker          |
| Warehouselman           | Wool Comber              |
| Watchmaker              | Woollen Draper           |
| Watch Case Maker        | Wool Spler               |
| Watch Chain Maker       | Worsted Man              |
| Watch Key Maker         |                          |



*The Art of drawing and shadowing, with the Black Lead Pencil, Indian Ink, Camel's Hair Pencil, and Crayons; containing such plain and easy Directions for drawing in general, as, with little Attention and Practice, will enable any one soon to become a Proficient in that polite and useful Science.*

**D**RAWING is the Art of Expression by Lines and Shades. The necessary Materials are Black Lead Pencils, Crayons of black, white, or red Chalk, Crow Quill Pens, a Rule and Compasses, Camel's Hair Pencils, and Indian Ink.

Hold your Pencil further from the Point than you do your Pen in Writing. With this draw your Outlines, which may be mended occasionally. This being done to your Mind, draw carefully the best Outline with your Crow Quill Pen and Indian Ink. After which the Pencil Lines are to be rubbed out with stale Crumb of Bread. The Rule and Compasses are only to measure the Proportions. Crayons are generally used on coloured Paper, and the Colours are rubbed one into another, so that no Strokes appear, but the whole looks as if done with a Brush.

The

The Appearance of Substance, Roundness, and Distance, is owing to the proper Management of *Light* and *Shade*. Draw a Circle, fill it up with any even Colour, and it is a round Circumference and flat Sides. Colour it stronger in the Middle, weakening it gradually towards the Circumference, and it becomes a Ball or Globe. Wherever the Vivacity of Colour is prevalent, that Part first catches the Eye and seems nearest to it. In rounding the Parts of an Object, the Changes must be imperceptible by Degrees of Light into Shadow, and of Shadow into Light. Objects painted Light must have a sufficient Breadth of Shadow to sustain them; and dark Bodies must have Light behind, to disengage them from the Ground or other Objects. For the Opposition of Shade to a light Object, and of Light to a dark one, gives a Projection and separates them from other Bodies.

Preserve a Balance between Light and Shade. A broad Light must have a large Shadow. Objects, placed foremost, must be more finished than those behind; and they must have a relative Dominion over each other, according to their respective Distances. The Opposition of Light and dark renders the Object more sensible and brings it nearer; but White, unsupported by Black, will fly off to the remotest View. Pure Black must be placed in Masses, be insensibly confus'd, and must have its proper Repose. Bodies must have Lights suited to their supposed Situations. If the Sun be not visible, you should introduce an almost universal Light, yet not warm and strong, and your Shades must be faint. If he is conspicuous and bright, the Light must be very strong and bold, and the Shadows very dark. If the Object be supposed in a Room, a little illuminated, and you survey it from without and stand on a Level with the Light that strikes upon it, the Shades of that Figure must be very soft, and then it will appear beautiful to the Eye, seeming embossed, and will come boldly out. A small Light illuminating a Body makes the Shadows on the dark Side large, and their Extremities very bold. A larger Light makes them more distinct and soft in their Limitations.

Reflection must be used in delineating shining Bodies, as Glass, Pearls, Silver, &c. And the Cause of the Reflection, be it more or less, must be seen in the Thing itself. Place all your Lights one Way through the whole Work. A Side-Light requires the other Side to be darkest. That Part must be lightest which has the Light most opposite to it. If the Light be placed above the Head, then the Top of the Head must be lightest. The Shoulder must receive the next greater Degree of it. And thus continue to shade, losing the Light gradually. The Parts which project most must be lightest,

and those which bend inward, must be so much the darker. Two equal Lights must never be in the same Piece. The greater Light must strike forcibly into the Middle, and with superior Lustre on those Parts where the principal Figures and Strength of the Action seem to lie, diminishing it gradually, as it approaches the Extrémities of the Piece.

*General Rules for DRAWING.*

Begin with plain Geometrical Figures, as Lines, Angles, Triangles, Polygons, Arches, Circles, Ovals, &c. These are the Foundations of all Proportions. Being ready at these, accustom yourself to give every Object its due Shades, according to its Concavity or Convexity, and to elevate or depress the same, as it appears nearer to or farther off the Light. But before you begin to work, view your Original with close Attention; divide it, in your Mind, into several Parts; observe the Length, the Breadth, and the Similitude of each Part; consider their Proportion to each other and to the whole, with their Distances and several Oppositions. The Outlines must be drawn in a gliding Manner, large and smooth. This gives the Resemblance of Life and Motion. Preserve a Justness between the Parts and the whole. Every Member must correspond. Decrepid Age, or a consumptive Body must have suitable Limbs: And the Eyes, Legs, Hands, and Feet, should be exactly paired. When you have done your Copy, view it afresh and compare it with the Original, for the Discovery and Amendment of Faults. This will not only perfect you in that particular Draught, but will improve your Knowledge of Lines and Proportions in general, and qualify you for the nearest Imitations. Procure the best Copies, and learn to alter them to other Proportions, greater or smaller, by frequent Practice. In drawing Fruits, Leaves, Herbs, Trees, Beasts, Fowls, Fishes, &c. you should not only be perfect in laying down the exact Proportions, but, before you shade and trim your Work, be well acquainted with the general or outward Lines. This is still more necessary in imitating the human Figure, as also in the Drapery or Clothing, and the artificial setting off of the outward Coverings, Habit and Ornaments of the Body, in their natural and proper Folds.

*Particular Directions for DRAWING.*

Place your Picture or Print in such a Light that the Gloss of the Colours may not interrupt your View; but so that the Light and your View may fall equally and obliquely upon the Piece. Therefore consider in what Point and from what Direction the Light falls upon the Objects, according to which

let



let all your Lights and Shades be placed throughout the Work, observing the Rules before given. The Piece should be placed at such a Distance, that, on opening your Eyes, you may view it all at once, and the larger the Picture is, at the greater Distance it should be placed; but right before you and a little reclined. Draw all your Outlines at first faint with a Coal, yet true and agreeable to the Pattern, before you shade. These Outlines may be easily rubbed out with a Duck's Feather or Crumb of Bread. Those next the Light should be more faint. One Feature drawn will direct you in some Measure to draw another, by observing the Distance from that to the next, making a full Mark at the next with your Coal. Then draw it, and so proceed to the next, till you have drawn the whole Figure. Then observe the Middle of the Picture, and touch the Paper with the Point of your Coal. Afterwards observe the more conspicuous and uppermost Figures, if more than one, and touch them lightly in their proper Places. Thus you will see at length the Skeleton of the Piece which you are to draw. These Sketches made, observe diligently if they answer the Pattern; for Life ought to shew itself eminently in the first Draught. Correct what is amiss, adding and diminishing as it varies from the Pattern. Note the Distance of one Limb, Joint, or Muscle, from another, and the same in all other Accidents of the Figure, their Length, Breadth, Turnings, &c. Where you see bold and free Touches, be not timorous in expressing them.

In drawing a Head, place the Features exactly right upon the Cross-Lines. In Fore-Shortening, make the Cross-Lines fly upwards; but where the Aspect is downwards, they must be made downwards in a circular Manner. Having drawn the Outlines true with a Coal, trace the same Lines again with a Pen, Indian Ink, &c. with more Exactness; and by imitating all the Hatches, with their exact Distances one from another, their Crossings, Turnings and Windings, with more Boldness and Freedom perfect your Design.

In drawing after a naked Body, all the Muscles are not to be so plainly expressed as in anatomical Figures; but that Side, whose Parts are most apparent and of Signification in the Action, is to appear more or less, according to the Force of that Action.

In young Persons the Muscles must not be so hard as in elder and full grown. Observe the same as to fat and fleshy Persons, and such as are delicate and beautiful. In Women scarce any are to be expressed, unless in some very forcible Action, and then very faintly. The like as to Children. The Motion of the whole Body must be considered. In the rising

and falling of the Arms, the Muscles of the Breast appear more or less; the Hips do the like, as they are bent outward or inward; and it is the same chiefly in the Shoulders, Sides and Neck, according to the several Actions of the Body.

The Proportion of the Figure is to be multiplied by Degrees of one to two, three, four, &c. Herein the chief Skill consists. The Diameter of the biggest Place between the Knee and the Foot is double the least, and the largest Part of the Thigh is triple.

*Of drawing FACES.*

A Head is usually divided into four equal Parts, 1. From the Crown of the Head to the Top of the Forehead. 2. Thence to the Eyebrows. 3. Thence to the Bottom of the Nose. 4. Thence to the Bottom of the Chin. But the Features of different Persons often differ as to Length and Shape: Yet in a well proportioned Face they are nearly right.

First draw a complete Oval. In the Middle of this, from the Top to the Bottom, make a perpendicular Line; thro' the Center of which draw another Line across from Side to Side. On these two Lines the Features of the Face must be drawn thus; divide your perpendicular Line into four equal Parts. The first takes in the Hair of the Head. The second is from the Top of the Forehead to the Top of the Nose between the Eyebrows. The third descends to the Bottom of the Nose; and the fourth to the Chin. The Line across the Perpendicular is the Breadth of the Face, and includes the Length of five Eyes. Divide it therefore into five equal Parts, leaving the Length of one Eye exactly in the Middle, and the same Space on either Side. This is to be understood only of a fore-right Face. For if it turns to either Side, the Distances must be lessened, in Proportion to its Turning, on that Side which turns from you. The Top of the Ear must be parallel to the Eyebrows, at the End of the Cross-Line, and the Bottom of it equal with the Bottom of the Nose. The Nostrils must not come farther out than the inner Corner of the Eye. And the Middle of the Mouth must be on the perpendicular Line. The Mouth, when shut, is as large as an Eye.

The following Device may assist Beginners in forming the Face according to its different Turnings. Have a Piece of smooth Wood turned in the Shape of an Egg. Draw a Line lengthwise quite round it. Divide this Line into two equal Parts by another Line drawn directly across it at Right Angles. The Features drawn on these two Lines, by the above Rules, will produce a fore-right Face. Turn the Oval a little from the left Hand to the right, and the Perpendicular

will

will represent a Bow, upon which the Features are to be drawn. But you are always to observe how the Nose projects beyond the Round of the Oval. The Case is the same if you turn the Oval from the Right to the Left. If you incline the Oval downwards, and to the Right, the Chin will then be turned in, the Top of the Head will be brought forward, and the left Ear will discover itself, while the Right is entirely concealed; and so on the contrary. But in drawing a Side Face a perpendicular Line is to be drawn from the Top of the Forehead, by the inner End of the Eyebrow, along the Middle of the Nostril, down to the Chin; and the Round of the Forehead and the Rest of the Nose are to project beyond the Line.

If the Face be fat, the Cheeks will swell; if lean, they will fall in, and the Jaw-Bones will stick out: If neither too fat nor lean, it will be nearly round. Touch the Features lightly, where the Eyes, Nose, Mouth, and Chin should stand; then begin to draw them more exactly, and proceed till you have finished the Face. Then draw the Hair, Beard and Shadows. And remember always that projecting Parts receive the Light, and those that are depressed, the Shade. Consider all those nice Touches which give Life and discover the Disposition of the Mind. The Mouth extended and the Corners a little turned up shew a smiling Countenance, &c. Be careful not to make the Shadows too dark where they should be light, because that cannot be mended; and make them more faint and light in a fair, than a swarthy Complexion.

*Of the Human Body, its Measures, and Proportions.*

The Moderns commonly divide their Figure into ten Faces. From the Crown of the Head to the Forehead is the third Part of the Face. The Face begins at the lowest Hairs upon the Forehead, and ends at the Bottom of the Chin. The Face is divided into three proportioned Parts. The first contains the Forehead; the second the Nose; and the third the Mouth and Chin. From the Chin to the Pit between the Collar-Bones are two Lengths of a Nose. From that Pit to the Bottom of the Breast is one Face. Thence to the Navel one Face. From the Navel to the Genitals one Face. Thence to the upper Part of the Knee two Faces. The Knee contains Half a Face. From the lower Part of the Knee to the Ankle two Faces. From the Ankle to the Sole of the Foot Half a Face.

When the Arms and Fingers are stretched out at Length, a Man is as broad as he is long. From one Side of the Breast to the other makes two Faces. The Bone from the Shoulder

to

to the Elbow is two Faces long. From the Elbow to the Root of the little Finger is two Faces. From the Box of the Shoulder-Blade to the Pit between the Collar-Bones is one Pace. The Sole of the Foot is the sixth Part of the Figure. The Thumb contains a Nose. From the Inside of the Arm to the Middle of the Arm is four Noses. Thence to the Beginning of the Hand is five Noses. The longest Toe is one Nose. The two utmost Parts of the Teats, and the Pit betwixt the Collar-Bones of a Woman, make an equilateral Triangle. No precise Measures can be given of the Breadth of the Limbs; because they are changeable, according to the Quality of the Persons, and the Movement of the Muscles.

In drawing full Lengths, first make your Oval for the Head, and having divided it, as above; draw a perpendicular Line from the Top of the Head to the Sole of the Foot, and measure out eight Lengths of the Head. This Line will direct you in placing the Figure upright, and in the Action of the Posture, where it falls in, and where it swells out. One Head's Length from the Chin draw the Breasts; the third Measure reaches to the Navel; the fourth to the Privities; the fifth to the Middle of the Thigh; the sixth to the lower Part of the Knee; the seventh to the lower Part of the Leg, and the eighth to the Heel and Sole of the Foot.

Observe in every Measure what Touches there are of the Muscles. Draw that Leg first on which the Body stands; then the other; after that the Arms and Hands. But draw all the Parts very lightly at first with a Coal only, which may be soon altered or rubbed out. The Hands are twice as long as they are broad. The Finger Nail is Half the Joint it is upon. And the Length of the Face and Hands must be exactly equal, and a tenth Part of the whole Length.

A Child contains five Measures of the Head, viz. from the Top of the Head to the Privities three, and in the Thighs and Legs two more. The Breadth between the Shoulders is the Length of a Head and a Half. The Breadth of the Body above the Navel, is the Length of one Head. The Breadth of the upper Part of the Thigh, is the third Part of two Lengths of the Head. The Breadth of the Knee is just the Measure betwixt the Eyes and the Chin. The Small of the Leg, and the Brawn of the Arm are of the same Thickness with the Neck. — Always begin with the right Side of the Piece which you are copying. First sketch the Head; then the Shoulders, in their exact Breadth; then the Trunk of the Body, beginning with the Arm-Pits (leaving the Arms till afterwards;) and so down to the Hips on both Sides; noting the exact Breadth of the Waist: Then draw the Leg which the Body stands upon; then the other, then the Arms, and last of all the Hands. Endeavour to form all the Parts with



Truth, and in just Proportion; not one Arm or Leg bigger or less than the other; not broad Shoulders, with a slender Waist; nor raw and bony Arms, with thick and gouty Legs: But let there be an agreeable Symmetry throughout the Figure.

Draw no Part perfect or exact, till the whole Draught be finished to your Mind. Eyes, Ears, Legs, Arms, Hands, Feet, &c. require great Care, Study and Practice; imitate the best Prints or Drawings you can get of them; it is difficult to draw Hands and Feet, and well worth while to bestow Pains upon them, that you may not only avoid all Lameness and Imperfection, but give them their various Postures and Actions with Life and Spirit.

The Eyebrow is the principal Seat of Expression. The Fire and Motion of the Eye, shews well the Agitation of the Spirit. But the Motion of the Eyebrow differs as the Passions change. When the Eyebrows rise up in the Middle, you discern agreeable Sensations; and then the Mouth rises at the Corners. But if they rise up at the Ends and fall in the Middle, it denotes Pain; and then the Mouth falls at the Corners. In Laughter all the Parts agree; for the Eyebrows, falling towards the Middle of the Forehead, make the Nose, Mouth and Eyes, follow the same Motion. In Weeping, the Motions are compound and contrary; for the Eyebrows fall towards the Nose, and over the Eyes; and the Mouth rises that Way. When the Mouth shoots forward and rises in the Middle, it expresses Aversion.

The Head expresses all the Passions; more peculiarly, Humility, by hanging down; Arrogance, by its Elevation; Languishment, by a Side-Inclination; and Obstinacy, by being stiffly fixed between the Shoulders. Yet, though the Passions of the Soul are most visible in the Face; they often require the Assistance of other Parts. The Actions of the Hands particularly are almost infinite, and create numberless Expressions.

*Of Drapery.*

In clothing your Figures, these three Points are to be observed; the Order of the Folds or Plaits; the different Quality of the Stuffs; and the Variety of their Colours. The Folds should be so managed, as to distinguish what it is they cover, whether it be an Arm, Leg, &c. They should be large, and a Contrast should be observed between them; otherwise they break and divide the Sight too much, and the Drapery will be too stiff. The Quality of the Stuffs should next be considered; some Folds being abrupt and harsh, while others flow more soft and easy. Again the Surface of some have a Lustre, while others are flat and dead: Some are fine and transparent, while others are firm and solid. Some are not equally agreeable with Respect to each other; and some are never to be placed near certain others.



The Drapery must not stick too close, but seem to flow round and embrace the Parts; yet so that the Figure may be easy and have a free Motion. Therefore the Nudities of the Figure should always be designed before you draw the Drapery. Draw the Outlines of the Garment lightly; then the great Folds; stroking these into lesser, and taking Care that they do not cross one another. But Folds, in general, should be large, and as few as possible. They must, however, be greater or less, according to the Quantity and Quality of the Stuffs supposed to be worn. They must suit, and bend with the Body; and the closer the Garment sits, the narrower and smaller must be the Folds.

The Quality of the Person should also be considered. The Drapery of Magistrates must be large, fine and flowing; of Clowns, coarse and short; of Ladies and Nymphs, light, soft, and airy. All Folds consist of two Shades and no more, which you may turn with the Garment at Pleasure, shadowing the inner Side more deeply. The Shades in Silks and fine Linen are very thick and small. Let the loose Apparel all fly one Way; and draw that Part of the Garment which adheres closest to the Body, before the looser Part that flies off; lest you mistake the Position of your Figure.

Rich Ornaments must never be applied to Angels or heavenly Figures. The Grandeur of their Drapery is to consist rather in the Boldness and Nobleness of the Folds. Flying Draperies are only proper to Figures in great Motion or in the Wind. But when in a calm Place, and free from violent Action, the Draperies should be large and flowing; that by their Contrast and the Fall of the Folds they may appear with Grace and Dignity.

#### *OF MIXED FIGURES.*

Begin with the Lead or Coal at the Forehead of any Beast, drawing downward the Nose, Mouth, upper and nether Chap: Then viewing it, proceed from the Part where you first began, and continue over the Head, Ears and Neck, till you have given the full Compass of the Buttock. Then mark out the Legs; touch the Breast with its Eminency; finish the Tail, Paws, Tongue, Teeth, Beard, and the several Shadows; taking Care to give a Sketch of the Country natural to the Beast.

In Birds, begin also at the Head, continuing the Breast Line from under the Throat down to the Legs. Then begin at the Pinion for the Wing. This being joined to the Back-Line, the Figure will soon be finished. The Eyes, Legs and Tail are to be drawn last. The Feathers, beginning at the Head very small, must fall backwards one Way in five Ranks, still encreasing till finished.

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In drawing Flowers, begin from the Rose-Tuft in the Middle; which done draw Lines equally divided from thence to the greatest Compass or Extent of the Flower. They may be drawn either fully open or in Bud; the Leaves may first be rudely drawn; giving them afterwards their Veins and Jaggedness.

*Of LANDSKIPS, BUILDINGS, &c.*

The Distances of each Part of your Piece are to be nicely measured by the Eye. Imagine that the Piece you copy is divided into Squares. Imagine a perpendicular and Horizontal Line, crossing each other in the Centre of the Picture. Suppose also two such Lines crossing your own Copy. Observe in the Original what Parts of the Design those Lines intersect, and let them fall on the same Parts of the intended Copy. If you draw from Nature, take your Station on a rising Ground, which commands a large Horizon. Mark your Tablet into three Divisions downwards, from Top to Bottom. Divide, in your Mind, the Landskip you are to take into three Divisions also. Then turn your Face directly opposite to the Middle of the Horizontal Line, keeping your Body fixed, and draw what is directly before you, on the Middle Division of your Tablet. Then turn your Head, not your Body, to the left Hand, and delineate what you view there, joining it properly to what you have done before. Lastly, do the same by what is to be seen on your right Hand; laying down every Thing with exact Distance and Proportion. Make the nearest Objects the highest, and those that are farther off to shoot away lower and lower, till they come almost level with the Horizon; lessening every Thing proportionably to its Distance, and observing to make your Objects fainter, the farther they are removed from the Eye. Make all your Lights and Shades fall one Way. Let every Thing have its proper Motion; as Trees shaken by the Wind; the small Boughs bending more, the large ones less; Water agitated, dashing against Ships, &c. or tumbling from a Precipice on Rocks or Stones, spirting up again into the Air, and sprinkling all round; Clouds now gathering, now condensed into Hail, Rain, &c. Remembering that all Motions caused by the Wind, must be made the same Way.

Let the Work imitate the Season represented. A Winter-Piece must have felling of Woods, Sliding, Fowling, Hunting, &c. The Trees must be naked, or loaden with Snow, Hoar-Frost, Icicles; the Earth bare; the Air heavy; the Water frozen, and the Ice passable, &c.

Every Site must have its proper Graces, as Farm-House, Wind or Water-Mill, Woods, Flocks, Herds, Pilgrims, Ruins, Castles, Monuments, &c.

**A CATALOGUE of useful Things, or MEMORANDUMS necessary to be known and remembered on several Occasions, by all Persons in Business.**

- A** Ream of paper 20 quires.  
 A quire of paper, 24 or 25 sheets.  
 A bale of paper, 10 reams.  
 A roll of parchment, or vellum, 5 dozen, or 60 skins.  
 A dicker of hides, 10 skins.  
 Ditto of Gloves, 10 dozen pair.  
 A last of hides 20 dickers.  
 A load of timber, unhewed, 40 feet.  
 A chaldron of coals 36 bushels.  
 A hoghead of wine, 63 gallons.  
 Ditto of beer, 54 gallons.  
 A barrel of beer, 36 gallons.  
 Ditto of ale, 32 gallons.  
 A weigh of cheese, 236 lb.  
 The great hundred is 112 lb.  
 Pence in a pound, 240. Far. 960.  
 8 Pint dry, liquid meas. a gallon.  
 8 Gallons a bushel of corn.  
 8 Bushels of corn a quarter.  
 A last of corn or rape seed, 10 quarters, or 80 bushels.  
 Ditto of pot ashes, cod fish, white herrings, meal, pitch and tar, 12 barrels.  
 Ditto of flax and feathers 17 cwt. of gunpowder 24 barrels, or 2400 lb. of wool 4368 lb.  
 An ell English is 45 inches.  
 An ell Flemish is 27 inches.  
 A ton of wine is 252 gallons; oil of Greenland, ditto.  
 A tun in weight is 20 cwt. of iron, &c. but in lead there is but 19 cwt. and a half, called a fother, which is 2184 lb.

*Barrels of sundry Commodities.*

- Anchovies, 30 lb.  
 A double barrel, 60 lb.  
 Nuts or apples, 3 bushels.  
 Pot ashes or barilla, 200 lb.  
 Oil, 31 gallons and a half.  
 Candles, 10 dozen lb.  
 By troy weight, bread, corn, gold, silver, jewels, and liquors are weighed; and, by avoirdupois weight, every thing else. By dry measure, corn, salt, coals, lead, ore, oysters, mussels, and other dry goods are measured. A firkin of soap or butter is equal to a firkin of ale, two making a barrel.

- A tod of wool is 28 pounds.  
 A pack of ditto, 364 pounds.  
 5 and a half yards, a pole.  
 40 Poles in length; a furlong.  
 8 Furlongs in length, a mile.  
 1760 Yards, a mile.  
 144 square inches, a foot.  
 9 square feet, a yard.  
 40 square poles, a rood.  
 4 square rods, an acre.  
 4840 square yards an acre.  
 640 square acres a mile.  
 1728 solid inches, a foot.  
 17 solid feet, a yard.  
 48 solid feet of timber, a ton.  
 231 solid inches, a wine gallon.  
 282 ditto, beer or ale, ditto.  
 1 lb. avoirdupois, is equal to 7000 grains troy.  
 1 oz. avoirdupois, is equal to 437 and a half grains troy.  
 4 lb. Avoirdupois, is equal to 5 lb. troy nearly.  
 A firkin of butter, 56 lb.  
 A pipe or butt, 120 gallons.  
 A quintal or kintal, a cwt.  
 A load of bricks 500, and plain tiles 1000.  
 A stone of fish 8 lb. and of wool 14 lb.  
 The same for horseman's weight, hay, iron, shot, &c.  
 Ditto of glass 5 lb. and a seam of ditto 24 stone.  
 A cade of red herrings 500, and of sprats 10000.

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